Volume I October 1953 Number 10

JOURNAL OF

THE AMERICAN GERIATRICS SOCIETY

OFFICIAL JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

PUBLISHED BY THE WILLIAMS & WILKINS CO.

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ANNUAL MEETING—SAN FRANCISCO—JUNE 17, 18 & 19, 1954

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JOURNAL OF

The American Geriatrics Society

Official Journal of the American Geriatrics Society

VOLUME I | *October, 1953* | NUMBER 10

RELATION OF PHYSIOLOGIC AGING TO PHYSICAL MEDICINE*

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Wakefield, R. I.

Many physiologic changes take place as one advances in years. These changes should be borne in mind when physical therapy is resorted to. It has been said that what will cure the young may kill the old.

The normal physiologic modifications inherent to the aging process vary in different persons. Sometimes these appear early in life; sometimes late. Much depends on hereditary influences.

In general the physiologic changes of aging manifest themselves in the fifties—sometimes earlier. The first noticeable symptom is usually sensitiveness to cold, due to lowering of the body temperature (1). If the basal metabolic rate is ascertained, it also may be lower than usual. Lowering of the basal metabolic rate is one of the first signs of aging. Many symptoms attributed to the senile climacteric are in reality those of the aging process (2).

The tissues in advancing years become dry. The associated loss of elasticity, is followed by degeneration.

The vibratory sense, especially when involving the deep reflexes, is lessened. The superficial nerves are not as sensitive as formerly. The knee reflexes are sometimes diminished.

There are, of course, various pathologic processes accompanied by lessening of the vibratory sense in the legs. Diabetes mellitus, leukemia, vitamin B deficiency, pernicious anemia and myxedema are among the diseases which affect the deep reflexes.

The tissues of the aged are easily injured, following which recuperation is likely to be poor. Cell division is slower (3). Therefore, the elderly can seldom withstand anything but gentle treatment when the tissues of the extremities are involved. Physical medicine, if indicated, should be used only if great care is taken not to injure the tissues.

Received for publication March 30, 1953.

* Presented at the Tenth Annual Meeting of the American Geriatrics Society, New York, N. Y., May 28–30, 1953.

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Gentleness required in treating elderly people

Gentleness in handling the elderly is essential. The methods used routinely in Veterans' Hospitals will not work well if applied to older persons; in fact, they may prove detrimental and worse than the disease.

There is a tendency to use massive doses of medicine and physical therapy in the treatment of elderly patients (2). Some physicians hesitate to modify standard therapy. A good geriatrician is conservative.

I remember watching the late Robert T. Morris operating. With minimum handling of tissues, his patients recovered better than those who had to withstand a more casual technique. Morris not only advocated gentle manipulation but he was swift—"in and out," if at all possible—and he never made an incision any longer than necessary. His after-care was as gentle as his surgery.

Rough handling of patients is sometimes obvious in clinics in which the treatments are more or less mechanical. In such clinics physically handicapped patients may be guided very casually, certainly allowed to feel that they are unprivileged.

Patients undergoing physical therapy may be placed in an uncomfortable position, which lessens the effectiveness of the treatment. Another definite handicap is inflicted on the patient who travels too far to obtain treatment; fatigue sets in before the treatment begins.

Physical therapy has to be accompanied, in most cases, by a certain amount of psychotherapy. If one neglects the personality of the patient during treatment, the results are not always satisfactory. Quiet encouragement, with careful selection of words, is not to be overlooked.

Ultrasonic therapy

Although this form of physical medicine has not been used to any extent in this country, it has been used successfully for several years in Europe. I have been using it for some time and am impressed by the results—especially in osteoarthritis. Ultrasonic therapy is based on waves which vibrate at about a million oscillations a second. The machine which produces the sound is a quartz generator in contact with the patient through a sound-head.

Ultrasonic or sound therapy has an anti-inflammatory effect (4). It generates a certain amount of heat in the tissues. Since contact with the body is established, the application of mineral oil to the skin is necessary to obtain good results. The treatment is chiefly used for such conditions as osteoarthritis, bursitis or fibrositis. I have found it especially effective for osteoarthritis of the knees, hips, and spine in the elderly.

As a rule twelve or fourteen treatments (1.5 watts for five minutes) are given at three- or four-day intervals. The patient returns every six months for two treatments involving only a maintenance dose.

This form of therapy should not be used too vigorously. The tendency seems to be to increase the dose of therapeutic agents in older patients who do not respond. I am convinced that if the patient does not respond to treatment, the dose should be reduced. This applies to any type of treatment. Ultrasonic

therapy should be reduced from 1.5 to 1 watt. More may be achieved through conservative doses than with massive ones.

If one discontinues ultrasonic therapy when the patient complains of pain in the bone, this form of treatment seems safe. The danger (also inherent to other forms of physical therapy) lies in massive doses over a prolonged period. In one clinic the results with ultrasonic therapy have been better since smaller doses were used. The tendency to use heavy dosage is perhaps due to the patient, who does not believe that he is "getting enough" unless he feels heat in the tissues. This idea is incorrect, because with ultrasonic therapy the patient should feel nothing. If there is a sensation of warmth in the tissues there is something wrong. The patient must be warned that he will not experience any sensation from the treatment.

A five-minute treatment is as effective as a longer one. To repeat, overtreatment may be detrimental. One should not yield to patients' whims. I remember being told by a masseuse that many older people demand an hour's massage at one session. There should be no rationalization of prolonged treatments of any kind in geriatrics. Old people are too easily tired.

One must not overlook possible delayed results. Most patients think in terms of immediate relief. If they are having a course of ultrasonic treatments they expect a cure to coincide with the last treatment. There is often a delayed reaction following ultrasonic and other forms of therapy. Several weeks after the treatment there may be noticeable improvement. This should be explained to the patient, especially in the treatment of osteoarthritis.

Personal therapy.

Perhaps we may express in these words the personal attention given a patient during physical therapy—the all-important human approach to illness. Nothing could be more objectionable than an operator with a negative personality. If a physician is willing to sit down and talk with his patient, he is not overlooking the psychosomatic aspects of most diseases in the aged.

Osteoarthritis illustrates the pattern of senescent reaction to disease. The patient imagines himself ultimately crippled. This seldoms occurs, but the patient fears the possibility; he should be reassured that, in all likelihood, he will not become incapacitated. There is no better way to become incapacitated than to think about it.

The emotional problem is always present in old age. To make plans for "next spring" is often helpful in the process of instilling the will to live in an elderly patient. Too many elderly persons are unconsciously thrown in the waste basket by us, if we have little time or inclination to treat them. Physicians who ask for data to be used in a paper they have been requested to give on the subject of the aged, when asked if they are interested in geriatrics, often reply "not especially." Then why attempt to discuss the subject? To treat the aged one must know what the normal physiologic changes are, and how to determine when they become pathologic.

Physical therapy, or any other form of therapy, is enhanced by psycho-

therapy. Old people are often starved for hope. An optimistic approach is highly constructive. The fact that they are given any attention, whether through treatment or conversation, makes them feel important. After all, even physicians like to be recognized. It makes life worth the effort.

One might include "P. T." (personal therapy) in the patient's record and ask the therapist not to overlook it. This would merely mean that the physician or therapist would ask the patient how he felt, what he ate, how he slept, and if his elimination was good—and more than that, if he had any difficult personal problems. Possibly I am expecting too much in a busy world. The work load is great. But it has often been a satisfaction to accomplish as much with a maximum of attention to the elderly person's welfare as with expensive therapeutic agents. In fact, one may find that it is unrewarding to treat the aged without personal therapy.

Other forms of treatment

Therapy involving heat must be resorted to with caution in geriatrics. It is an accepted fact that the vibratory sense is lessened in the aged; as with diabetes mellitus, many are unable to feel an excess of heat. *Infrared* and *luminous lamps* should not be over-used.

Diathermy is dangerous because it is difficult to ascertain whether the dose is excessive, unless the patient is able to say so. Twenty minutes of diathermy is usually sufficient. Now that ultrasonic therapy is available, there may be less need for diathermy. Time will tell.

Massage, if too vigorous, may be detrimental to the aged person. This applies to treatment for paraplegia or for fibrositis. Massage for fibrositis may be painful. For hemiplegia or paraplegia, prolonged and too violent massage may cause damage to the tissues. In many instances tickling massage for two or three minutes is sufficient. Underwater massage increases the efficiency of the treatment.

Tissue-release treatment of related zones

Behrend (5) has pointed out that the German technic of Leube and Dicke (6) is often valuable. These authors showed that, accompanying many subacute and chronic diseases, there are skin changes which are in reflex relationship with parts of the body distant from the site of the findings. Through the sympathetic nervous system there may be symptoms in the neck region from a trigger point in the lower back. By following the technic of Leube and Dicke (6), gentle, painless massage is given the patients, using only the tips of two fingers. Only a few minutes are required for a treatment. This replaces the older methods of deep massage, which really fatigue the patient.

There are many older people who have indefinite pains in the head, neck, chest, and extremities, which are due to so-called fibrositis. These pains may be reflexes from internal organs, or they may originate in the posterior root and spread from there to the peripheral dermatome, causing changes in tension of the skin and subcutaneous tissues.

Not infrequently headache is relieved by massage of the trapezius and splenius capitis muscles. Chest pain is often due to fibrositis of the pectoral, serratus anterior, or intercostal muscles. Gallbladder-like pain may be caused by involvement of the intercostal muscles.

In these cases the fingers applied to the skin reveal tense areas. The fingers follow with an outward movement from the spine, along the course of the nerve. These movements need not cause discomfort. Five minutes at a time is sufficient.

In cases of osteoarthritis of the knee, the use of ultrasonic therapy plus massage of the surrounding muscles will give relief to a condition which hitherto has resisted all therapy. Much time and money have been wasted on diathermy and heat treatments. Too often these patients have found that pills and injections have yielded no results. In obscure cases, a puzzled physician may resort to a placebo. Patients are partly at fault for this because they seem to demand "injections" for everything.

SUMMARY

The aged tissues will not always stand vigorous therapy. Therefore, "half treatments" are often sufficient.

When the patient does not respond to therapy, a decrease rather than an increase in the dose is often indicated.

Therapy, whether by means of ultrasonic waves, diathermy, heat or massage, should be gentle in senescent patients.

Ultrasonic therapy seems effective for osteoarthritis, fibrositis and sciatica, among other conditions.

Tissue-release treatment may be considered a form of scientific massage, which yields good results in many cases. Unlike deep massage, it is not painful.

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THE AGING SKIN

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As with all other organs, the skin inevitably grows old. To many, especially women, this normal process of aging is unpopular for esthetic reasons, albeit it produces but slight discomfort; to others, the process may be annoying and sometimes actually dangerous. The elderly patient escapes none of the cutaneous diseases to which younger people are prone, although some dermatoses occur more frequently in the older than in the younger age groups, and only a few tend to become less severe because of the passage of time.

The *normal cutaneous changes* of the aged, although of many types, are all basically degenerative. The skin assumes a yellowish or cachectic hue, with mild degrees of diffuse pigmentation of the body folds. The skin loses its tone owing to the loss of elasticity; because of this it is furrowed and wrinkled and, when the condition is augmented by the loss of subcutaneous fat, tends to hang in folds. Senile lentigenes (freckles), keratoses (Fig. 1)—both actinic (senile) and seborrheic—and small angiomas make their appearance. The skin may be dry, lusterless and slightly scaly, whereas the hair may be sparse or regress to the lanugo type. In women, however, especially after the menopause, body and facial hair may become more obvious, while the scalp hair is lessened.

There are factors other than age itself, which may produce certain of these changes. The sandy-haired, blue-eyed individual exposed frequently to the elements undergoes aging of the skin far more rapidly than does the individual with brown eyes and dark hair. This includes the *genetic factors* over which we have no control. The rare syndromes known as xeroderma pigmentosum, Werner's and Rothmund's syndromes are examples of premature aging. In fact we are convinced that many of the changes commonly associated with aging of the skin are not due to the age of the patient per se but rather to the type of skin with which he was born and the degree to which he exposed his skin to the physical agents, especially sunlight and wind.

Pruritus hiemalis or winter itch is a common cause of skin discomfort in people past middle life who life in the Northern climates. As the name implies it is a winter complaint in patients who bathe too often, have little humidity in their homes and wear short-legged underwear. The skin, especially on the legs, is dry and scaly and may show scattered small patches of dermatitis; the appearance of the trunk and arms may be the same. The avoidance of bathing, except a sponge bath in the groin and axillae, avoidance of soap, increasing the humidity in the home and wearing light-weight silk and cotton long-legged underwear help to ease the itching. Local applications in the form of a mild grease such as olive oil and lime water (equal parts) are usually the only medication needed, although any mild, greasy ointment is helpful.

Pruritus, which is one of the most unpleasant and annoying sensations man

Received for publication May 28, 1953.

is subjected to, frequently develops in older individuals and often is explained as being due to the senile changes in the skin. Pruritus may appear in association with arteriosclerosis and is accompanied frequently by other paresthesias such as burning, tingling, and formication. When an elderly patient complains of pruritus he should be examined thoroughly for infestations or evidence of insect bites or other cutaneous lesions. If no external explanation is found for the itching, a general examination is indicated. As with younger patients in whom generalized pruritus develops unaccompanied by primary cutaneous lesions, the older patient should be examined with particular reference to the kidneys, liver, hematopoietic system, and diabetes mellitus. Kidney disease, even with moderate elevation of urea, hepatic disease with or without jaundice, lymphoblastoma, diabetes mellitus, and thyrotoxicosis may produce intense generalized pruritus without significant changes in the skin. Zakon and associates (1) studied a large group of residents in a home for the aged and found

FIG. 1*a*. Seborrheic keratoses which are benign. Note "stuck on" appearance. *b*. Actinic (senile) keratoses, right cheek, with epithelioma of the right preauricular area.

that more than 42 per cent complained of pruritus which was thought to be on the basis of arteriosclerosis. They remarked, too, on the paucity of significant cutaneous disease among the persons examined but felt that the lack of it was due to the selection of this group of residents.

The relief of a pruritus associated with arteriosclerosis is difficult, because the underlying factors are incapable of being overcome satisfactorily. Although the patient may be treated symptomatically the results are not favorable, since the use of antihistaminic preparations both locally and orally has proved disappointing, and the many antipruritic lotions and ointments which are of help to some patients will produce in others untoward reactions in the form of a contact dermatitis. Colloidal baths of various types are of help in the relief of pruritus. Three such colloidal baths are prepared as follows:

Cornstarch and Soda Bath.—Make a cold-water paste of 1 cup of cornstarch and ¼ cup of baking soda. Put the foregoing into about ½ tub of warm water. Bathe twenty to thirty

minutes daily, or less often if the skin continues to dry. Some prefer to boil the starch paste before mixing with soda.

Oatmeal Bath.—Boil 2 cups of bulk oatmeal in 1 quart of water for thirty to forty-five minutes in a double boiler. Allow to cool for fifteen minutes, then add ½ cup of baking soda. Pour the entire mixture into a gauze bag and tie shut. Place in a bathtub one-half to three-fourths full of water at about 90° to 96°F. The patient may stay in the tub one-half hour to two hours, expressing the oatmeal mash through the gauze and applying it over the body. Wash off the mash thoroughly before leaving the tub. Dry by patting, not rubbing.

Aveeno® Bath.—Slowly sprinkle ¾ to 1 cup of Aveeno® into 6 or 7 inches of warm bath water; mix thoroughly. Preferably do not wash off Aveeno before drying. To minimize lumping, put 1 cup of Aveeno and 2 cups of cold water into a quart jar; shake vigorously; pour into warm bath water.

Grais (2) has found Aveeno, a prepared oatmeal, to be efficacious in the relief of "senile pruritus," 33 of 46 patients so treated having been relieved of the pruritus. He also noted that the cleansing of soap-sensitive or irritated skin with this preparation proved effective and that this type of cleansing did not degrease the skin.

Elderly patients with arteriosclerosis will often complain of severe "crawling sensations" or burning streaks. In fact, they will go to extremes to demonstrate the "insects" which cause the discomfort but which under a microscope are collections of skin debris such as epithelial cells, lint, or sebaceous materials. These patients do not accept gracefully the idea that they are not infested and reject the idea that their skin discomfort is the result of their arteriosclerosis.

A large percentage of the cutaneous complaints of older people center about the development of *benign, premalignant and malignant new growths.* From a clinical standpoint the recognition of these lesions is most important; for the benign lesions, reassurance is good advice and treatment need be given only for esthetic and cosmetic reasons, whereas premalignant and malignant lesions require destruction. Table 1 depicts the types of lesions frequently encountered.

The type of treatment given malignant lesions of the skin depends upon one's training and experience. Obviously in the presence of multiple metastatic lesions to the skin from a systemic malignant process, no treatment is of value except palliative roentgen or radium therapy, and even this is but rarely indicated. In all cases of suspected malignancy, tissue should be removed for microscopic diagnosis. Epitheliomas of the basal-cell, squamous-cell, or basosquamous-cell type may be either 1) excised, followed by suture of the wound edges, or 2) excised, and healing allowed by second intention, or 3) excised, and the remaining defect grafted. The small lesions may be fulgurated, desiccated, or destroyed by actual cautery. The squamous-cell lesions of low grade are roentgen and radium resistant. Chemosurgery may produce good results. In smaller and superficial lesions (less than 1.0 cm. in diameter) we have found that curetting the lesion until firm healthy tissue is continuous in all dimensions, followed by electrodestruction of the base and periphery, is a simple and rapid procedure which is productive of equally good results when measured cosmetically and by absence of recurrences.

Certain cutaneous conditions tend to become less severe with the passage of time and as those afflicted become older. Examples of these are psoriasis, dermatitis herpetiformis, pityriasis rubra pilaris, and lupus erythematosus. More commonly, in the elderly, *dermatitis* tends to be more resistant to therapy and to have a more prolonged course when compared with the same condition in younger age groups. In elderly patients also there is more of a tendency toward development of treatment dermatitis (overtreatment) and sensitization dermatitis.

Stasis dermatitis is a common disease in elderly people. It is seen most often in those who have varicose veins, or who had a previous phlebitis, or in any condition that tends to produce edema in the legs. The dermatitis may precede

TABLE 1

Types of Cutaneous New Growths

Benign	Premalignant*	Malignant
Cutaneous tags	Actinic (senile) keratoses† (Fig. 1*b*)	Basal-cell epithelioma
Seborrheic keratoses (Fig. 1*a*)	Arsenical keratoses	Basosquamous-cell epithelioma
Dermatofibroma	Leukoplakia	Squamous-cell epithelioma
Xanthelasma		Superficial epitheliomatosis
Senile angiomas (ruby spots, de Morgan spots)		*Less common:—*
		Bowen's disease
		Paget's disease of nipple
		Intra-epidermal carcinoma
		Melanoma
		Metastatic growths from underlying malignant lesions to the skin

* Approximately 10 to 20 per cent of the so-called premalignant lesions ultimately become malignant—usually squamous-cell type.

† We prefer the term "actinic keratoses" to "senile keratoses," for they have less to do with aging than with the type of skin and the influence of physical agents, especially sunlight.

by years the appearance of a stasis ulcer. Auto-eczematization is a frequent complication of stasis dermatitis and as a result of the hypersensitization of the patient's skin elsewhere than on the legs, a dermatitis will develop. These eczematoid lesions may appear on the trunk, arms or thighs and persist so long as the dermatitis of the legs remains, or may result in a complete generalization. Treatment may require a period of complete rest in bed, with feet elevated and mild wet dressings. Later, as the dermatitis subsides, the patient may be allowed increased activities but, when he is on his feet, adequate supportive bandages must be in place and these dressings should be applied before the patient gets out of bed. The patient, when up and about, should be encouraged to move constantly, for the muscular activity of the limbs prevents much of the stagnation and stasis of the flow of blood. Surgical treatment of the incompetent veins should be performed when indicated. Often older patients present a benign con-

dition known as stasis hemosiderosis, a localized hyperpigmentation of the lower legs, which in itself requires neither treatment nor supportive bandages.

The problem of *herpes zoster* in older age groups should be emphasized, not because of the eruption itself but because of the persistent and often agonizing postherpetic neuritis which develops. The treatment of such neuritis, especially when of several months' duration, is not completely satisfactory. It seems to us that the prompt and early treatment of the herpes zoster itself by autohemotherapy, roentgen therapy to the involved nerve root, intravenous use of sodium iodide and pituitary extract tends to prevent the development of neuritis and to bring about improvement if neuritis is present. Antibiotics are helpful in the treatment of the secondary infections but not for the herpes itself or the accompanying neuritis. Likewise our experience with cortisone or corticotropin (ACTH)

FIG. 2. Leukoplakic vulvitis with kraurosis. Note atrophy and leukoplakia as thickened white areas.

has been unsatisfactory. Other measures advised have been cobra venom, protamide, and vitamin B_{12}, but these still are of little value when given late in the course of the disease, although they may have some merit when given early.

The *genital lesions* peculiar to elderly women are prominent postmenopausal complaints. It is here that differential diagnosis is important, because it is often difficult to distinguish between leukoplakic vulvitis (Fig. 2), pruritus vulvae (Fig. 3) with lichenification, and lichen sclerosus et atrophicus (Fig. 4). Kraurosis vulvae is senile atrophy and is not precancerous. Nevertheless, the area may be pruritic and if sufficient trauma by scratching occurs, the area may become lichenified and the sodden area of thickened tissue may closely simulate leukoplakic vulvitis. Leukoplakic changes may appear in areas of kraurosis and the area is then premalignant. Lichen sclerosus et atrophicus may also closely simulate the foregoing and may remain confined to the vulva; however, as a rule, the lesions extend to the perineum and about the anus in a characteristic "key-

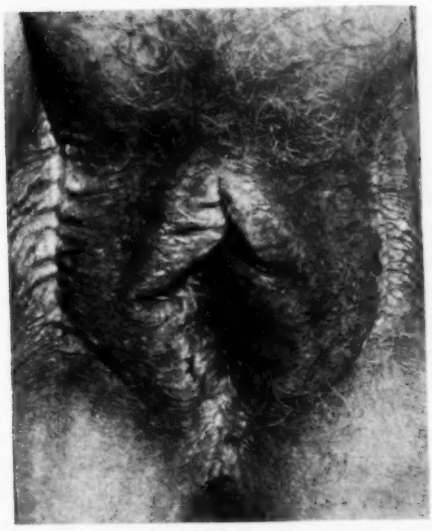

FIG. 3. Pruritus vulvae with lichenification. Note also the crural involvement.

FIG. 4. Lichen sclerosus et atrophicus. Note the papular element and keyhole distribution extending down about the anus.

hole" distribution; also, similar lesions may be found on the shoulders, upper part of the back, and breasts. Lichen sclerosus et atrophicus is characterized by pearly gray, flat plaques, throughout which are scattered minute specks. It is a benign condition, which may be left alone in most patients if it presents no subjective symptoms. In addition to appropriate local therapy, conservative administration

of estrogens and vitamin A (50,000 to 100,000 units daily) may bring varying degrees of improvement.

TREATMENT

In the space of this paper it is impossible to discuss treatment of the senile skin in great detail; yet a few generalizations may be given. The choice of topical measures is determined by the character of the dermatitis, the guide being the most acute lesion present. For the acute, oozing, vesicular eruption, wet dressings of Burow's solution, boric acid, or potassium permanganate (1:15,000 solution) are advised, as well as soothing baths such as oatmeal or starch and soda; for the subacute types of dermatitis with only slight weeping or crusting, shake lotions and mild soothing ointments may be used, such as calamine lotion, N.F., or an ointment of 5 per cent boric acid in nonperfumed cold cream. Another mild ointment frequently used is 3 per cent ichthyol in U.S.P. zinc oxide ointment. Many of the newer water-miscible ointment bases and emulsion type bases are soothing to the skin and, if necessary, a variety of pharmaceutically active drugs may be added to them. For chronic, scaly, lichenified and thickened lesions, more stimulating ointments, such as those containing tar (1 to 3 per cent) or salicylic acid (2 to 3 per cent) are frequently indicated.

There are two principles of dermatologic therapy: 1. When in doubt as to the type of treatment to give, use the mildest and most soothing type first. In this regard, it is well to apply the ointment to only a small area first, to watch for possible untoward reactions and to observe the improvement, if any, before proceeding to treat a large area. By this method it is possible to use two or more preparations in small areas as "trials." 2. Do not change the treatment when it is improving the dermatosis, but change if the dermatologic signs have become worse or remain stationary.

Systemic therapy may be an adjunct to the local applications for the pruritus, which is often the main complaint that brought the patient to the physician. Antihistaminic preparations may give some relief but are not the excellent antipruritic agents they were thought to be at one time. Aspirin is a capable antipruritic and may be given in doses of 10 grains (0.65 Gm.) two to five times daily. Autohemotherapy likewise is frequently an effective antipruritic and seems to produce an additional beneficial response in dermatitis. Stronger measures of foreign-protein therapy, such as those that produce fever, are not advised for the elderly patient.

Dietary measures also have their place in the treatment program, although allergic dietary factors are seldom the cause of cutaneous disease in elderly people. If food sensitivities are suspected, dietary restrictions according to the methods of Rowe or Flood may be attempted. Skin tests for dietary allergens have been unsuccessful in our hands as far as the actual management of the patient and his dermatitis is concerned. It seems to us far more important to maintain or develop an adequate dietary intake with emphasis on the proteins, rather than to restrict them. In patients with widespread dermatoses, especially when asso-

ciated with much scaling or exudation, a high-protein and high-caloric intake is indicated.

Although cortisone and corticotropin (ACTH) have been shown to be of some value in the relief of inflammatory dermatoses and pruritus, their use in older patients must be attended with great caution and full knowledge of possible dangerous physiologic side effects. Except for a few conditions in which their use may extend life temporarily, the administration of these preparations should be confined to the patient who has acute, rapidly progressive dermatitis with sensitization which cannot be controlled with the usual therapeutic measures. If cortisone or corticotropin must be used, it should be given in full dosage for two or three days and then the dose should be reduced rapidly, so that the total course of therapy does not last more than seven to ten days.

SUMMARY

We have attempted to define the problems of geriatric dermatology and have presented a discussion of the problems encountered most frequently, together with helpful hints in the management of these problems.

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SURGICAL TREATMENT OF NON-MALIGNANT DISEASE OF THE BILIARY TRACT IN PATIENTS 65 YEARS OF AGE AND OLDER*

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INTRODUCTION

The present study is an analysis of a twenty-year experience with biliary tract disease and associated surgical procedures in aged patients. Data were obtained from the records of all such cases treated on the surgical pavilion services of The New York Hospital. It was found that there were 1,592 operative cases among patients over 50 years of age, including 300 in patients over 65 years of age, during the two decades subjected to analysis (1932–1952).

As a result of this scrutiny, it is suggested that geriatric patients with biliary tract disease represent unique problems for the surgeon. In some instances (*i.e.*, in acute cholecystitis) it is felt that a more aggressive surgical approach is indicated, because of greater inherent dangers in nonoperative treatment. In others, more conservative techniques, the aim of which is to relieve symptoms and avert catastrophe rather than to cure (*i.e.*, cholecystostomy), are peculiarly suited to this age group.

Following a brief comment on previous studies of this problem, we shall attempt to make deductions and draw limited conclusions from the care of the rather large series of aged patients who have required surgical treatment for biliary tract disease in this medical center. Our concept of the ideal preoperative evaluation and management of these patients is outlined. The problems of anesthesia, operative technique and postoperative management are discussed. Finally, the result of treatment in these aged patients, as it varied with their preoperative status and with the type of operative therapy that they received, is subjected to analysis.

The basis for the recommendation of an elective biliary tract procedure in the geriatric patient is based on either (a) the need for relief of symptoms, or (b) the prevention of acute cholecystitis, common duct obstruction, or biliary tract carcinoma. In the majority of cases the deterrent factor is the presence of degenerative disease processes. The weighing of these two divergent influences is an individual problem for the physician to contend with. It is hoped that the data presented may be of aid in providing a more rational basis for decision.

PREVIOUS STUDIES

Twenty years ago studies of small series of geriatric patients undergoing abdominal surgery began to make their appearance in the medical literature (1, 2). These were preceded by the reports of adventurous specialists in the fields of

Received for publication May 30, 1953.

* Presented at the Tenth Annual Meeting of the American Geriatrics Society, New York, N. Y., May 28–30, 1953.

urology (3) and orthopedics (4), who relieved prostatic obstruction and secured internal fixation of the fractured femur with admirable disregard for age and debility. Surgical students of trends in population in the United States have been stressing (a) the increasing life expectancy and (b) the increasing proportion of our population among older individuals, for two decades. We are now at the stage when it can be said that this prophecy has been realized. The past five years have marked the appearance of excellent studies of hundreds of surgical cases (5, 6, 7) among the aged, many of whom come from hospitals dedicated exclusively to the care of thousands of geriatric patients (6, 8).

Early outstanding works on special phases of geriatric surgery, including gastric carcinoma (9, 10), appeared in the 1930–1940 decade (11, 12). Many recent articles have covered a wide range of conditions requiring surgery in the aged, including appendicitis (13), intestinal obstruction (14), trauma (15), emergency surgery (6, 16) and herniae (17).

TABLE 1

Surgical Treatment of Non-malignant Biliary Tract Disease in the Aged

1,592 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Operative procedure	Age 50–64 Yrs.	Age 65 Yrs. & over
Cholecystectomy	1,020	160
Cholecystostomy	37	43
Choledochotomy	44	20
Cholecystectomy plus choledochotomy	158	66
Cholecystostomy plus choledochotomy	6	0
Relief of stricture, and misc. procedures	27	11
	1,292	*300*

In 1939 a study was reported of 100 operative cases of non-malignant biliary tract disease in patients 65 years of age and older (18).

NEW YORK HOSPITAL SERIES—CLINICAL MATERIAL AND METHODS

Age, diagnosis and type of operation

A total of 1,592 patients 50 years of age and older underwent surgical procedures for non-malignant disease of the biliary tract on the pavilion (ward) services of The New York Hospital during the twenty-year period from September 1, 1932 through August 31, 1952. Three hundred of these patients were 65 years of age or older (Table 1).

Among the patients 65 years of age and older acute cholecystitis was established as the diagnosis in 87 (29 per cent), and chronic cholecystitis in 202 (67 per cent). Eleven patients (4 per cent) were operated upon for various conditions including benign strictures of the common duct (Table 2). In the less aged group (patients from 50 to 64 years of age) there were 277 cases (22 per cent) of acute

cholecystitis, 988 cases (76 per cent) of chronic cholecystitis, and 27 cases (2 per cent) of benign stricture and miscellaneous conditions.

The operative procedures carried out on these geriatric patients are outlined in Table 1. In the group from 50 to 64 years of age, the following operations were performed: 1,020 simple cholecystectomies, 37 cholecystostomies, 208 common duct explorations (with cholecystectomy or cholecystostomy in 164 cases) and 27 explorations for such conditions as common duct stricture. In the group of patients 65 years and older there were 160 simple cholecystectomies, 43 cholecystostomies, 86 choledochotomies (with cholecystectomy in 66 cases) and 11 operations for benign choledochal stricture and miscellaneous conditions.

TABLE 2

Non-malignant Biliary Tract Disease in the Aged

1,592 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Form of disease	Age 50–64 yrs.		Age 65 yrs. & over	
	No. of cases	% of total	No. of cases	% of total
Chronic cholecystitis	988	76.5	202	67.3
Acute cholecystitis	277	21.4	87	29.0
Strictures and misc. conditions	27	2.1	11	3.7
	1292	*100.0*	*300*	*100.0*

Preoperative evaluation

Geriatric patients require an extensive study of each organ-system prior to operation. If time will permit, this should include electrocardiography and pulmonary, hepatic and renal function studies. When indicated, the aid of internists concerned with these problems in aged patients, should be requested.

An evaluation of the 300 patients who were 65 years of age and older was made, using only data available to the surgeons, or to consultants such as cardiologists, at the time of the decision to resort to surgery. On the basis of the apparent degree of severity of chronic extrabiliary-tract disease processes, this group of geriatric surgical candidates could be divided into the following groups:

	No. of patients
(a) No major degenerative disease processes	117
(b) Hypertensive cardiovascular disease[1]	116
(c) Arteriosclerotic heart disease	47
(d) Diabetes mellitus (moderate to severe)	14
(e) Chronic pulmonary disease	16
(f) Cirrhosis	6
(g) Chronic renal disease	4
(h) Miscellaneous major chronic diseases	11

[1] The criteria for these diagnostic classifications is noted in the section on Results of Operation.

Sixteen patients were classified in both groups (b) and (c), and 8 in both groups (b) and (d). Several patients had multiple degenerative disease processes in advanced stages (*see* Case No. 4, #601 114 cited in Discussion). Only 18 of the 83 male patients had significant prostatic obstruction (in 7 prostatectomy was carried out prior to the biliary-tract procedure). In 27 cases a diagnosis of diverticulitis (colonic) was established by barium enema. The influence that the presence and extent of these degenerative disease processes exerted on the mortality and complication rate following surgery is noted subsequently (Table 8).

Anesthesia

The great majority of the patients in this series were operated upon under a light, general anesthesia, using either ether or cyclopropane.

The metabolism in this age group is usually low and therefore there was little or no need for a narcotic in preoperative medication. Excessive premedication, which is associated with depression of respiratory and cardiovascular function, is unfortunate. Atropine was used preoperatively in preference to scopolamine, as often scopolamine will produce delirium rather than depression in these older patients. Atropine in a dosage of 0.3 mg. is usually sufficient to control secretions. Senile emphysema is a frequent finding; therefore assisted respiration should be used. This helps to remove carbon dioxide, which readily accumulates due to the obstructive nature of the emphysema. Ether, because it is a respiratory stimulant, has some advantage. The employment of a small dose of 2.5 per cent pentothal sodium in the induction of anesthesia may remove the physic trauma arising from the application of the face mask.

Arteriosclerosis is the rule in this group. Dilatation of peripheral vessels and even minimal blood loss are poorly tolerated. Deep planes of surgical anesthesia, surgical trauma and extreme positions on the operating table should be avoided as much as possible. A muscle-relaxing drug is indicated only when the required plane of anesthesia produces too great a strain on the respiratory or cardiocirculatory mechanisms. Therefore, of the utmost importance are light preoperative medication, minimal blood loss, a position on the operating table which does not severely overtax the circulation, a plane of anesthesia just sufficient for surgery, and a high oxygen intake.

Surgical procedures

In this group of aged patients, cholecystectomy was carried out through either a right rectus or a right subcostal incision, depending upon the patient's chest configuration. Long incisions of either type, providing adequate exposure and eliminating the necessity for deep planes of anesthesia or strenuous retraction, are tolerated best. The abdominal cavity can be examined thoroughly through such an incision, permitting the discovery of unsuspected lesions. Exploration seems particularly advisable in all patients in this older age-group, notwithstanding the increased operating time. The gallbladder was removed from the fundus downward to the cystic duct. The right hepatic artery was identified before the cystic artery was ligated, as its increased tortuosity in older patients

more frequently brings it into the region of the cystic duct or ampulla of the gallbladder. The cystic duct was divided approximately 0.5 cm. from the common duct, which was exposed sufficiently to ascertain signs of dilatation or chronic inflammation. The course of the common duct was palpated in all cases. A drain from the region of the gallbladder bed was passed through a separate incision in the right flank.

Cholecystostomy was performed under general anesthesia, as noted previously, or under local novocain infiltration anesthesia. The fundus of the gallbladder was sutured securely to the parietal peritoneum and a mushroom catheter left in the lumen for ten days. These patients were made ambulatory at once.

Exploration of the common bile duct was performed through a longitudinal, 2-cm. incision on the lateral aspect of the choledochus, distal to the cystic duct orifice. The indications for exploration of the duct in aged patients are similar to those in younger patients, *i.e.*, the presence of icterus, a history of jaundice, a palpable calculus, dilatation or distortion of the choledochus, or a history of recurrent cholangitis. In doubtful cases, cholangiograms were employed. Following either exploration or cholangiogram, the common duct was drained with a small rubber catheter through the stump of the cystic duct; or, if this was not feasible, with a "T" tube or a "Y" tube.

Postoperative management

Following surgery, these patients were made ambulatory within the first twenty-four hours, usually on the evening of the day of operation. Micturition and defecation could thus be carried out in the sitting or standing position throughout the postoperative period. Catheterization of the urinary bladder was usually unnecessary under this regimen; but if urinary retention occurred, a balloon-type catheter was passed and bladder drainage maintained for several days. This did not interfere with ambulation of the patient.

All patients in whom a general anesthesia had been used were treated by gastric suction with an indwelling tube for twelve to twenty-four hours. Oral fluids were commenced shortly thereafter, and a strenuous effort was made to return the patient to a solid diet by the third or fourth day following surgery. Hydration was maintained with intravenous solutions, including the essential electrolytes and vitamins, during this period. Rarely was more than one liter of water administered intravenously on the day of surgery, and thereafter approximately 1,500 cc. (for a 70-Kg. patient with normal renal function) of water was given per day until return to alimentation was complete. Sodium chloride was administered only in the amounts lost through gastric suction. Potassium chloride was used intravenously only in patients without renal complications who required gastric suction for longer than the usual period of twenty-four hours.

A rapid return to a general, balanced diet was the paramount aim in these aged patients. This was usually best accomplished through multiple small meals, containing sufficient fat to maintain the appetite.

Opiates were used rarely, and then in small amounts. Minimal doses of

barbiturates or chloral hydrate were at times necessary to secure rest. Mental confusion was found to be an accompaniment of the sedation secured by the "routine" administration of opiates and barbiturates, and respiratory depression followed by bronchopneumonia was a frequent complication when these drugs were used in standard dosage. Even greater care had to be exercised in administering sedation to geriatric patients with jaundice, or known cirrhosis (biliary or otherwise). Small doses of codeine phosphate were found to be the least deleterious, when pain became a major problem. The routine administration to these patients of any sedative or opiate on a specified, scheduled basis constitutes a menace, as a cumulative effect can readily result in profound depression of cerebral and respiratory functions.

TABLE 3

The Surgical Treatment of Chronic Cholecystitis in the Aged

1,190 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Procedure	Age 50 to 64 yrs.			Age 65 yrs. & over		
	No. of cases	No. of deaths	Mortality %	No. of cases	No. of deaths	Mortality %
Cholecystectomy	799	12	1.5	118	4	3.4
Cholecystostomy	8	1	12.5	11	3	27.2
Choledochotomy	44	1	2.3	20	1	5.0
Cholecystectomy plus choledochotomy	132	10	7.6	53	2	3.8
Cholecystostomy plus choledochotomy	5	3	60.0	0	0	0
	988	*27*	*2.7*	*202*	*10*	*5.0*

RESULTS

A. *General*

There were 56 postoperative deaths[2] in the series of 1,592 patients, representing an overall mortality of 3.6 per cent. Thirty-seven of these fatalities occurred in patients with a diagnosis of chronic cholecystitis. Among the patients between 50 and 64 years of age there were 27 deaths (mortality 2.7 per cent) and among the patients over 65 years of age there were 10 deaths (mortality 4.9 per cent).

Among those patients with an established diagnosis of acute cholecystitis (364 cases), there were 16 postopraetive deaths, 6 occurring among individuals 50 to 64 years old (mortality 2.1 per cent) and 10 among those who were 65 or older (mortality 11.4 per cent).

Three postoperative deaths occurred in the group of patients subjected to surgery for benign strictures and miscellaneous conditions.

Another approach to the analysis of mortality in this series is shown in Tables 3 and 4, in which the postoperative deaths are separated according to the type of operation performed.

[2] Deaths occurring during the hospitalization period.

Among the patients with chronic cholecystitis undergoing simple cholecystectomy (917), there were 12 fatalities among the 799 patients between the ages of 50 and 64 years (mortality 1.5 per cent) and 4 fatalities among the patients 65 years of age and older (mortality 3.4 per cent). High mortality rates among the cases of chronic cholecystitis in which a simple cholecystostomy was performed are noted in Table 3; there were 4 postoperative fatalities among 19 patients in this group. In patients with chronic cholecystitis, when choledochotomy was combined with cholecystectomy the mortality was 7.6 per cent among the patients 50 to 64 years of age (10 deaths in 132 cases), and 3.8 per cent (2 deaths) among the patients 65 years of age and older (53 cases).

A similar analysis of the mortality in patients in whom a pathologic diagnosis of acute cholecystitis was made, is found in Table 4. Simple cholecystectomy among the 221 patients 50 to 64 years of age was followed by 2 deaths (mortality, 0.9 per cent), whereas among those patients 65 years of age and older

TABLE 4

The Surgical Treatment of Acute Cholecystitis in the Aged

364 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Procedure	Age 50 to 64 yrs.			Age 65 yrs. & over		
	No. of cases	No. of deaths	Mortality %	No. of cases	No. of deaths	Mortality %
Cholecystectomy	221	2	0.9	42	3	7.1
Cholecystostomy	29	2	6.8	32	5	15.6
Cholecystectomy plus choledochotomy	26	2	7.6	13	2	15.3
Cholecystostomy plus choledochotomy	1	0	0	0	0	0
	277	*6*	*2.2*	*87*	*10*	*11.5*

there were 3 postoperative fatalities (mortality, 7.1 per cent). Cholecystostomy was followed by a 6.8 per cent mortality among 29 patients between the ages of 50 and 64, and a 15.6 per cent mortality among the 32 patients 65 years of age and older. When choledochotomy was combined with cholecystectomy, the mortality rate was 7.6 per cent for the individuals 50 to 64 years of age (26 cases) and 15.3 per cent for those 65 years of age and older (13 cases).

Tables 5 and 6 show similar analyses in relation to the decade in which the patients were treated—whether 1932–1942 or 1943–1952. There was a noticeable overall decrease in mortality in the latter period, particularly in the case of operations for acute cholecystitis in the 65-and-over age group.

B. *Acute cholecystitis*

A total of 87 patients, 65 years of age or older, with acute cholecystitis (proven by microscopic section) were treated in this institution during the aforementioned twenty-year period (Table 4). Cholecystectomy was performed in 42 of these cases (mortality 7.1 per cent),[3] cholecystostomy in 32 (mortality 15.6 per

[3] Mortality figures include all patients expiring during the period of hospitalization in which surgery was performed, regardless of the cause of death.

TABLE 5

Surgical Treatment of Chronic Cholecystitis in the Aged: (Comparison by Decade)
1,190 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Operative procedure	1932–1942			1943–1952		
	No. of cases	No. of deaths	Mortality %	No. of cases	No. of deaths	Mortality %
Age 50–64						
A. Cholecystectomy	286	9	3.2	513	3	0.6
B. Cholecystostomy	8	1	12.5	0	0	0
C. Choledochotomy	15	1	6.6	29	0	0
D. Combination of A or B, plus C	72	7	9.7	65	6	9.2
	381	*18*	*4.7*	*607*	*9*	*1.5*
Age 65 and over						
A. Cholecystectomy	25	1	4.0	93	3	3.2
B. Cholecystostomy	5	2	40.0	6	1	16.6
C. Choledochotomy	5	0	0	15	1	6.6
D. Combination of A or B, plus C	10	0	0	43	2	4.6
	45	*3*	*6.6*	*157*	*7*	*4.5*

TABLE 6

Surgical Treatment of Acute Cholecystitis in the Aged: (Comparison by Decade)
364 Patients 50 years of age and over, The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Operative procedure	1932–1942			1943–1952		
	No. of cases	No. of deaths	Mortality %	No. of cases	No. of deaths	Mortality %
Age 50–64						
A. Cholecystectomy	96	1	1.0	125	1	0.8
B. Cholecystostomy	14	0	0	15	2	13.3
C. Combination of A or B, plus choledochotomy	19	1	5.3	8	1	12.5
	129	*2*	*1.6*	*148*	*4*	*2.7*
Age 65 and over						
A. Cholecystectomy	9	1	11.1	33	2	6.1
B. Cholecystostomy	13	3	23.1	19	2	10.5
C. Combination of A or B, plus choledochotomy	6	2	33.3	7	0	0
	28	*6*	*21.4*	*59*	*4*	*7.3*

cent), and an exploration of the choledochus with cholecystectomy in 13 (mortality 15.3 per cent).

Of the 10 deaths, 4 were attributed to acute manifestations of chronic degenera-

tive disease processes (2 cases of myocardial infarction, 1 of cerebrovascular accident, and 1 of severe nephrosclerosis with uremia). Three deaths were the result of peritonitis or intra-abdominal abscess, *i.e.*, sepsis; in one of these cases there was a free perforation of the gallbladder prior to operation, and in a second the organ was completely gangrenous at the time of surgery. Two patients expired from diffuse intrahepatic infection and cirrhosis; in one of these, a perforation of the gallbladder six years prior to death had resulted in the formation of multiple fistulae, choledochal obstruction, and ultimately cholangitis and cirrhosis. One patient had uremia secondary to lower nephron nephrosis (autopsy) (Tables 10 and 11).

It is of interest that in 3 of these deaths the major factor producing the fatality was gangrene and perforation of the gallbladder.

C. *Chronic cholecystitis*

A diagnosis of chronic cholecystitis was substantiated by microscopic section in 1,190 patients (operative) over 50 years of age, including 202 cases in individuals 65 years of age and older (Table 3).

In the 65-and-over group, elective cholecystectomies were performed in 118 cases (mortality 3.4 per cent), cholecystostomies in 11 cases (mortality 27.2 per cent) and cholecystectomy plus choledochotomy in 53 cases (mortality 3.8 per cent). A simple choledochotomy was carried out in 20 patients (mortality 5 per cent).

The causes of death (7 fatalities) in this age-group were multiple. They included 1 case of myocardial infarction on the day following surgery, 2 of bronchopneumonia (in the pre-antibiotic era), 1 of ascending cholangitis and intrahepatic abscesses associated with unrelieved common duct obstruction, 1 of intra-abdominal abscess and 1 of acute hemorrhagic pancreatitis.[4] Four of these deaths followed simple cholecystostomy. In these cases it was apparent that death resulted from the original disease processes (such as intra-abdominal abscess or hepatic abscess) and that the cholecystostomy was a minor incident in the general deterioration.

D. *Common duct exploration and miscellaneous procedures*

Ninety-seven of the 300 patients who were 65 years of age and over were subjected to choledochotomy, an operation incidence of almost 32 per cent. Stones or stone-like materials were recovered in 72. A high incidence of stones in the common duct is to be expected in this older age group, because choledolithiasis appears to be a complication of long-standing biliary tract disease.

At operation, stones in the common duct are much more readily detected in the aged group than in younger groups. In general, the stones are larger; for instance we have removed casts of stones measuring 8 x 4 x 4 cm. The common duct is often atonic and dilatation is more in evidence.

In those patients who succumbed following choledochotomy for chronic cholecystitis or miscellaneous procedures for stricture of the common duct, the paramount cause of death was intrahepatic disease. In each case there was a

[4] One unexplained death (in coma) without autopsy.

prolonged downhill course, and autopsy revealed such conditions as advanced cirrhosis, pericholangitis, or intrahepatic abscess. The picture was similar to that in younger patients in whom these complications develop.

E. *Elective cholecystectomy*

Of special interest were the instances in which the decision to operate was entirely elective—patients 65 years of age or older, with a history suggestive of chronic cholecystitis and with known cholelithiasis, but without acute symptoms, icterus, or even a history of jaundice.

From the data available before surgery was undertaken, these patients were evaluated and classified as to 1) the extent of degenerative disease processes, and 2) the presence of any apparent medical contraindication to surgery (Table 7). Operative and subsequent findings were ignored in this initial evaluation, as this was an attempt to reproduce the situation in which the original decision to

TABLE 7

Preoperative Evaluation of 126 Patients 65 Years of Age and Older, under Consideration for Elective Cholecystectomy: Extent of Degenerative Disease Processes

The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Classification	No. of Patients	Complications		Mortality	
		No.	%	No.	%
No major degenerative disease process	52	6	11.6	0	0
Hypertensive cardiovascular disease	59	8	13.6	1	1.7
Arteriosclerotic heart disease	15	1	7.0	1	7.0
Diabetes mellitus (moderate to severe)	8	1	12.0	0	0
Pulmonary emphysema, chronic bronchitis	9	1	11.0	1	11.0
	126			*3*	*2.4*

perform elective surgery was made. Thus, on the basis of the history, physical examination and routine laboratory studies (prior to surgery), the patients were divided into the following groups:

a) *No major degenerative or other disease processes (52 cases)*. The diagnoses (usually multiple) were osteoarthritis, generalized arteriosclerosis, colonic diverticulosis and diverticulitis, chronic urinary cystitis, multiple herniae, diabetes mellitus controlled without insulin, and benign prostatic hypertrophy. (Prostatectomy for benign prostatic hypertrophy was performed during the evaluation period in 7 cases.) The patients in this group were characterized by the absence of the disease processes noted subsequently. There were no postoperative deaths. In 6 instances (11.5 per cent) complications developed, none of which was permanently disabling.

b) *Hypertensive cardiovascular disease (59 cases)*. These patients had a sustained systolic blood pressure above 160 or a diastolic blood pressure greater than 90. They had cardiac enlargement and left ventricular preponderance. A blood pressure of 290/145 was the highest recorded in the group, and most of

the pressures lay midway between this figure and the minimum (approximately 210–220/110–120). There were no cases of malignant hypertension. There was 1 postoperative fatality (from coronary occlusion) and 8 postoperative complications (13.7 per cent).

c) *Arteriosclerotic heart disease (15 cases)*. These patients had sustained previous coronary occlusions (by electrocardiographic study) or showed electrocardiographic changes of a less marked degree associated with angina pectoris or cardiac decompensation. There was 1 death (from bronchopneumonia) and 1 complication following operation in this group.

d) *Diabetes mellitus (8 cases)*. Prior to surgery, these patients had classic diabetes mellitus requiring insulin therapy. No deaths or major complications followed operation, and no diabetic acidosis was encountered.

e) *Pulmonary emphysema, chronic bronchitis, and bronchiectasis (9 cases)*. These patients had markedly reduced vital capacity, by measurement. They had had

TABLE 8

Preoperative Evaluation of 300 Patients 65 Years of Age and Older, with Respect to Presence of Degenerative Disease Processes

The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Classification	No. of patients	Complications		Mortality	
		No.	%	No.	%
No major degenerative disease processes	117	17	14.5	5	4.3
Hypertensive cardiovascular disease	116	17	14.5	8	6.9
Arteriosclerotic heart disease	47	11	23.0	4	9.0
Diabetes mellitus (moderate to severe)	14	2	14.0	0	0
Chronic pulmonary disease	16	2	12.5	2	12.5
Cirrhosis	6	0	0	2	33.3
Chronic renal disease	4	0	0	1	25.0
Miscellaneous major chronic disease	11	2	18.2	2	18.2

symptoms of chronic pulmonary disease for from twenty to thirty years in most cases. One postoperative death (from coronary occlusion) occurred in this group, and 1 complication.

The mortality rate for the entire group of aged patients undergoing elective surgery was 2.3 per cent and the complication rate was 11.9 per cent.

The entire group of 300 patients 65 years of age and older was classified in a manner similar to that in the section on Preoperative Evaluation, in regard to the presence or absence of major degenerative disease processes prior to surgery. The mortality and complication rates in relation to these classifications are presented in detail in Table 8.

F. *Non-fatal complications*

A study of the non-fatal complications[5] found among these geriatric patients following surgery is of interest. The incidence of complications in the age group

[5] Defined as any condition developing in a postoperative patient, which prolongs hospitalization.

65 years and older, as compared with the younger group (50 to 64 years) is shown in Table 9. The incidence of cardiac complications and cerebrovascular accidents is slightly greater in the older group. The incidence of phlebitis and pulmonary infarction, as well as atelectasis and bronchopneumonia, is definitely greater in the younger group. The incidence of complications associated with poor wound healing (infections, hematoma formation, wound separations and the formation of fistulae) was not greatly different in the two groups (2.2 per cent in patients 50–64 years old and 3.3 per cent in those 65 years and older).

TABLE 9

Non-fatal Complications following Surgical Treatment of 1,592 Patients for Non-malignant Disease of the Biliary Tract

The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Type of complication	1292 Patients (50–64 yrs.)		300 Patients (65 yrs. & over)	
	Acute	Chronic	Acute	Chronic
Cardiovascular:				
Coronary occlusion	0	2	0	1
Auricular fibrillation (new)	1	2	2	0
Cerebrovascular accident	0	0	0	2
Mental confusion of unknown etiology	1	0	0	0
Pulmonary infarction	3	3	0	1
Phlebitis without pulmonary infarction	1	11	1	0
Infections:				
Bronchopneumonia, pleurisy	4	15	0	2
Pulmonary atelectasis	5	6	2	0
Wound infection	5	16	4	2
Wound separation, hematoma, evisceration	1	2	2	0
Persistent biliary fistulae	2	2	2	1
Peritonitis, intra-abdominal abscess, septicemia	3	2	0	1
Acute pancreatitis	0	0	0	2
Miscellaneous	0	4	0	1
	26	*65*	*13*	*13*
	91		*26*	
	117			

The total incidence of non-fatal complications in the 50–64 age-group was 7 per cent (91 complications), where in the 65-and-over age-group it was 8.7 per cent (26 complications). This difference seems insufficient to be used as a basis for restricting surgery in the older age group.

DISCUSSION

A consideration of the tables of this study reveals that in the aged patients, acute cholecystitis forms a greater part of the total number of cases of biliary tract disease than in younger patients. It is also apparent that acute cholecystitis represents a significantly greater menace to the aged patient. Chronic chole-

cystitis cases, regardless of the operative procedure used, have uniformly low mortality and complication rates, even in the very old. Exploration of the choledochus is well tolerated by geriatric patients. Plastic procedures on the common duct are accompanied by a high mortality in both age-groups. Only in those patients with some form of acute disease process is the mortality signif-

TABLE 10

Deaths Following Surgery for Non-malignant Biliary Tract Disease in 300 Patients 65 Years of Age and Over

The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Cause of death	No.
Hepatic decompensation—cirrhosis, infection or necrosis	7
Coronary occlusion or cardiac failure	4
Peritonitis, intra-abdominal abscess	2
Renal failure—known chronic renal disease, lower nephron nephrosis	2
Acute pulmonary disease—pulmonary infarction, pneumonia and lung abscess	2
Acute pancreatitis	1
Cerebrovascular accident	1
Miscellaneous	3
	22

TABLE 11

Deaths following Surgery for Non-malignant Biliary Tract Disease in 3,813 Patients

The New York Hospital-Cornell Medical Center, September 1, 1932–August 31, 1952

Cause of Death*	Among 2,221 pts. under 50	Among 1,292 pts. 50–64 yrs.	Among 300 pts. 65 yrs. & over	Total deaths
Hepatic insufficiency	4	9	7	20
Pulmonary embolus	2	5	1	8
Acute pulmonary disease	1	3	1	5
Peritonitis	1	3	2	6
Intraperitoneal abscess or fistula	1	4	0	5
Acute pancreatitis	2	0	1	3
Renal insufficiency	2	0	2	4
Acute coronary occlusion	0	2	4	6
Cardiac failure (no acute occlusion)	0	2	0	2
Miscellaneous	2	6	4	12
	15	*34*	*22*	*71*

* Seventy per cent confirmed by autopsy.

icantly increased in the geriatric group. A typical, non-fatal case of this type follows.

Case No. 1 (N.Y.H. #541 823). This 68-year-old female had a history of attacks of right upper quadrant pain for at least twenty years. These episodes of distress were accompanied by nausea, pyrexia and occasionally vomiting. She was seen on numerous occasions by physicians who apparently usually administered opiates. Fatty-food intolerance was marked, and attacks usually followed dietary indiscretions.

Sixteen hours prior to entry, a typical attack developed, with moderate right upper quadrant pain and nausea. Unlike previous episodes, however, in the present instance the pain became progressively more severe and the patient was admitted to the hospital as an emergency on the day of the onset of the attack. Physical examination revealed an elevated temperature (38.5°C) and pulse rate (90/min.) and a tender R.U.Q. mass in an aged female with moderate hypertensive cardiovascular disease. At operation an acutely inflamed gallbladder was removed. Pathologic examination gave evidence of long-standing cholecystitis with superimposed acute changes. The postoperative course was uncomplicated.

This almost prosaic case illustrates a usual history in acute cholecystitis. Definite, but not intolerable, symptoms of gallbladder disease may be endured by the patient for as long as twenty years. The acute attack begins in the same manner as its predecessors, but progresses rapidly to the state in which impending gangrene of the gallbladder is found at operation.

The group of 43 patients upon whom cholecystostomies were performed with relative high mortality rates merits some explanation in view of modern-day practice. They were patients who were having severe symptoms of biliary tract disease and were also suffering from other diseases in advanced stages. The following are examples:

Case No. 2 (*N.Y.H. #568 322*). This patient was an 80-year-old male who entered the hospital with a five-day history of right upper quadrant pain associated with fever. He had experienced similar attacks for several years.

The patient had noted palpitation, exertional dyspnea, and orthopnea for two years. Physical examination revealed a blood pressure of 200/100, pulse rate 84, and temperature 38.7°C. Bilateral moist rales were heard at the lung bases, extending up to the scapular region. A tender mass was palpated beneath the right costal margin.

On the day of admission, following the administration of antibiotics and emergency digitalization, this patient was operated on—a cholecystostomy being performed under local anesthesia.

His postoperative course was benign, although his cardiac symptoms continued and became more severe. One year later, he had a small sinus tract remaining at the site of cholecystostomy. No secondary operative procedure was contemplated and the patient survived for two additional years free from biliary tract symptoms.

This case illustrates the use of cholecystostomy under local anesthesia in a patient in a state of cardiac decompensation. His primary disease process did not improve sufficiently to make further surgery advisable.

Case No. 3 (*N.Y.H. #26 027*). The patient was an 80-year-old female with known chronic lymphatic leukemia (of three years' duration) under active radiation therapy. She suffered from Parkinsonian tremors, and had a large epigastric hernia.

Four days prior to entry she noted the onset of R.U.Q. pain which became progressively more severe. The patient was observed for forty-eight hours in the hospital, during which period a progressively enlarging mass in the right upper quadrant was palpated. Consequently a cholecystostomy was performed under local anesthesia on the third day following entry. Her postoperative course was uncomplicated and the cholecystostomy closed uneventfully several months later.

The patient expired two years later, due to complications of her leukemic process.

These are desperate situations in the older age-group. In Case No. 2 it was felt that the symptoms produced by the biliary tract intensified the patient's distress and disability, which were the result of his cardiac disease. It seemed that the least disturbing procedure that might partially if not totally relieve

these symptoms was the one of choice. The surgeon in evaluating such patients may do well to be content with procedures that allay rather than cure the disease.

The geriatric patient is a more frequent victim of choledocholithiasis (among biliary tract cases) than is the younger patient. When present, stones are more frequently multiple and larger in size than those commonly recovered from patients in a general-population group.

Consideration of the preoperative evaluation of the geriatric patient in regard to the presence and degree of degenerative disease processes (Tables 7 and 8) leads one to further recognition of the significance of the acute process in increasing the mortality.

Among those patients who entered the hospital for evaluation of chronic biliary tract symptoms (Table 7), and who were subjected to elective operative procedures following an appropriate period of study and preparation, the mortality was insignificant. This was true even in the presence of severe hypertensive cardiovascular disease, arteriosclerotic heart disease, diabetes mellitus, chronic pulmonary disease or combinations of these processes. As an example:

Case No. 4 (N.Y.H. #601 114). This 69-year-old white male entered the hospital with a history of intermittent epigastric distress and known cholelithiasis.

He had noted dysuria and urinary frequency for four years, with episodes of acute urinary retention. Hypertension (190/105) had been present for at least six years. Cardiac enlargement, left ventricular preponderance (by ECG), and apical murmurs were present, but there was no evidence of decompensation. The patient had been subject to almost constant attacks of "chronic bronchitis" for twenty years. These were associated with a productive cough. He had massive varicose veins with stasis dermatitis and a long-standing history of ankle and leg edema. A large right inguinal hernia was noted.

Physical examination, laboratory and radiographic studies confirmed the following diagnoses: a) prostatic obstruction without major renal damage, b) hypertensive cardiovascular disease (as noted), c) pulmonary emphysema and chronic bronchitis, d) varicose veins with marked edema and dermatitis, e) inguinal hernia (large), and f) chronic cholecystitis with cholelithiasis.

The initial operation was a prostatectomy (retropubic). Recovery was rapid and uneventful, and eleven days later a bilateral phlebectomy was carried out for varicose veins, followed three days later by a herniorrhaphy (inguinal). The patient now rested for an additional week, following which a cholecystectomy was performed. The patient was discharged from the hospital six days later, essentially asymptomatic, having undergone four significant operative procedures in a period of three weeks.

This case illustrates the benefits of the performance of a series of short operative procedures on an aged patient with multiple degenerative disease processes. All anesthesia periods were short (longest, two hours) and two of the operations were carried out, at least partially, under local anesthesia.

Consideration of the entire group of 300 geriatric patients (aged 65 and over), however, including those with acute cholecystitis and common duct obstruction gives one a strikingly different picture (Table 8). In this group there was not only a basic higher mortality in those patients without major degenerative disease processes, but hypertensive cardiovascular disease produced a significant further rise in the mortality and recognized arteriosclerotic heart disease produced a twofold increase in the probability of postoperative fatality.

The presence of severe arteriosclerotic heart disease, particularly with a definite history of a previous coronary occlusion, produces perhaps a slight increase in the mortality rate following elective biliary tract procedures, but a definite marked increase in the mortality rate following the emergency procedures.

Several patients in this series gave histories of tolerating incapacitating symptoms of biliary tract disease because they believed these symptoms were due to heart disease. We, as have others, have undoubtedly given incorrect advice to such patients, based on electrocardiographic changes. Meticulous history taking and exhaustive study is important in patients in whom this question arises. It is well to keep in mind that biliary tract disease and cardiac disease are frequently co-existent in the patient over 65. The recognized presence of either is an indication to search for the other.

To quote Stewart (19), "Gallbladder disease occurs in patients who have undisputed evidence of impairment of the coronary circulation, not only with history of myocardial infarction but also with attacks of angina pectoris. In them, activity of the gallbladder disease accounts for increase in incidence and severity of cardiac symptoms. If the functional capacity of the heart is not too greatly compromised and there is enough improvement in symptoms, surgical treatment of the gallbladder disease should be considered. It appears to be the safer course to perform an elective operation when the patient's condition is satisfactory."

CONCLUSIONS

1. Over a twenty-year period there has been a gradual increase in the proportion of patients 65 years of age and older treated surgically for non-malignant disease of the biliary tract in this clinic.

2. Paralleling progress in surgery generally, the morbidity from complications and the mortality rate in this age-group have been reduced:

1932–1942 (77 patients, 10 deaths) mortality rate, 13.1 per cent.

1943–1952 (223 patients, 12 deaths) mortality rate, 4.9 per cent.

3. The need for emergency intervention is often more acute in the geriatric patient than in the less aged, but the techniques employed are frequently more conservative, the aim often being palliation rather than cure.

4. The incidence of common duct stone is greater in patients 65 years of age and older. In our hospital series, the percentage of cases with acute cholecystitis was greater in this group. The influence of the presence of advanced degenerative disease on the mortality rate appears to be of real significance only in those patients with acute biliary tract disease.

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DIAGNOSIS OF RETROPERITONEAL TUMORS

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True tumors arising in the retroperitoneal space are not rare, over 500 having already been reported (1). If to these we add the neoplasms which develop in the pancreas, kidney and adrenals, the number becomes much larger. Retroperitoneal tumors manifest a great variety of forms and cellular structures, and the majority prove to be malignant. The symptoms are variable and seldom pronounced in the early stages, the patient complaining mainly of progressive abdominal enlargement (2). A thorough physical examination should be followed by careful laboratory studies of the gastrointestinal and urinary tracts. Displacement of these organs, without invasion, should make one suspect the diagnosis in the majority of instances (1, 2). In the remainder exploratory laparotomy is necessary for accurate diagnosis. In the differential diagnosis, one must consider the various common causes of the formation of intra-abdominal masses.

The retroperitoneal space lies between the peritoneum and the posterior parietal wall of the abdominal cavity (3). It is divided into lumbar and iliac fossae and extends upward to the twelfth rib, and downward to the base of the sacrum and the iliac crest. The lateral margins correspond to the lateral borders of the quadratus lumborum muscle. This space is occupied by fat, fascia, areolar connective tissue, lymphatic tissue, blood vessels and nerve fibers.

A brief review of the pathologic possibilities of neoplasms arising from the tissues in this space is pertinent to a discussion of their diagnosis. It is not helpful to divide the neoplasms into benign and malignant categories, because many appear to be borderline in this respect, and the correct diagnosis may be made only by thorough microscopic study and in some instances by observing the course of the patient after the surgical removal of the tumor. True retroperitoneal tumors may be solid or cystic, benign or malignant, adult or embryonal. Of the great variety of cellular types, many are undifferentiated (1, 3). In the older literature, the majority were considered benign, but more critical study in recent years indicates that more than half of all retroperitoneal tissue tumors are malignant.

VARIETIES OF RETROPERITONEAL TUMOR AND DIFFERENTIAL DIAGNOSIS

Retroperitoneal cysts are more common in the female, are usually found in the age period from 15 to 25 years, and are most frequent on the left side (4). In general, the cysts are composed of a fibrous tissue wall lined with a flattened epithelium, and are frequently diagnosed preoperatively as being of ovarian origin. They may be single or multiple, and they are subject to infection, which may call attention to the presence of the mass (3). Palumbo *et al.* (5) found teratomas twice as frequently on the left as on the right side. X-ray evidence

Received for publication April 4, 1953.

of bones or teeth within the tumor is an aid in making the diagnosis. Ten per cent of the teratomas are malignant.

Morgagni (6) in 1761 described the gross appearance of the first retroperitoneal tumor which was removed at necropsy, and Virchow (7) in 1857 made the first microscopic study of one.

Lipoma appears to be the most common benign form. Farbman (8) claims that approximately 70 per cent of the lipomas occur in patients of the ages from 40 to 70, and that the tumor is twice as common in females. He further believes that 50 per cent of the tumors in the male are malignant, whereas only 25 per cent are malignant in the female. Eighty per cent of these tumors are abdominal; 20 per cent are located in the pelvis. Lipomas are prone to recur because of incomplete removal of the tumor and because islands of undifferentiated tissue left behind may be stimulated to growth after removal of the primary tumor (9). Distant metastases are rare.

Stout (10) believes that, although some of the malignant liposarcomas may develop from pre-existing lipoma, most are malignant from the beginning. Cattell and Warren (11) wonder at the seeming physiologic paradox that the enormous accumulated fat stores occur simultaneously with systemic wasting and progressive cachexia. Physical and chemical analyses have failed to reveal differences in lipomatous and normal tissue fat which might account for the apparent unavailability of tumor fat for nutritional purposes. The largest lipoma on record was an autopsy specimen weighing 69 pounds, reported by Hirsch and Wells (12). These authors reported the results of extensive chemical analysis of a huge retroperitoneal liposarcoma, concluding that it did not contain as much fat as the gross specimen suggested.

A tumor may originate in the thigh and gain access to the retroperitoneal space through the femoral or obturator canals. Perirenal lipomas, which account for a considerable portion of all retroperitoneal tumors of fatty origin, may arise from the renal capsule or perirenal tissue. They may encompass the kidney and compress its blood supply, causing atrophy. These tumors show a marked tendency toward malignant changes and recur not infrequently in sarcomatous form, even though the original tumor was apparently benign. Hertzler (13) concluded that "retroperitoneal lipomata represent a very embryonal type of tissue and that rapid growth, myxoid and sarcomatous admixtures are but manifestations of a primary impulse." In 1946 Windholz (2) stated that lipomas grow very slowly and sometime reach a huge size, the yellow, soft, fluctuant mass of fat then filling the abdominal cavity from pelvis to diaphragm. About one third of the recorded cases display sarcomatous structures.

Donnelly (1) believes that *fibromas* and *leiomyomas*, like lipomas, tend to recur because the surgeon overlooked a small tumor which later grew and was considered a recurrence, or else the pathologist did not find the malignant element which existed in the original specimen. Newman and Pinck (3) report that fibromas may occur singly, in clusters, or as a series of unconnected growths. These tumors also frequently recur in sarcomatous form. Calcification has been noted in a fibroma (14). The diagnosis may be made when such calcification is

correlated with other x-ray findings. Golden and Stout (15) reported 8 leiomyomas which arose in the retroperitoneal space and 5 of them proved to be malignant. Three of these had given rise to metastases.

Donnelly (1) found *lymphangiomas* to be rare, and collected only 7 cases. Ward and Stewart (16) found only 6 hemangiomas reported in the literature. Miller (17) has described cases of retroperitoneal *neurolipoma, neurofibroma and schwannoma.*

Of the expressly malignant neoplasms, the *lymphosarcoma and fibrosarcoma* are the most common (3). They grow rapidly and progressively and are productive of pain, because the growth fuses with adjacent structures, resulting in tension on the nerves of the tissue invaded. These growths are usually single, but may be multiple and recurrent. They may be hard, solid and lobulated, but frequently become degenerated, cystic and hemorrhagic. Generally, metastases are late, except in children. Although metastases may occur anywhere, the most common sites are the liver and lungs.

Neuroblastoma usually originates in the adrenal medulla but rarely it may be found entirely independent of the adrenal gland (18). Cline *et al.* (19) speak of 22 cases of calcification in retroperitoneal neuroblastoma. They further state that this lesion and Wilm's tumor of the kidney are the two lesions which most frequently cause retroperitoneal masses in childhood. The presence of calcification suggests the diagnosis of neuroblastoma. F. Christopher (20) noted that 87 per cent of a series were in patients under 15 years of age and about one half were in patients less than 3 years old. Judd and Larson (21) reported that paraganglioneuromas are an infrequent type of sarcoma. McFarland (22) lists 94 reported cases of retroperitoneal ganglioneuromas.

Tumors arising from the pancreas, kidney and adrenal are generally solid and the great majority are malignant. *Carcinoma of the pancreas* continues to be a frequent and difficult diagnostic problem. In our hospital it occurs about eight times as often as retroperitoneal tumor. It is the most common "hidden" abdominal malignancy, especially when it arises in the body or tail of the organ, and often can be diagnosed only by exclusion. Abdominal distress, indigestion, weight loss and pain going through to the back, always suggests carcinoma of the pancreas.

A widespread impression has persisted for years that the syndrome of painless jaundice, palpable gallbladder, cachexia and weight loss are necessary to establish the diagnosis of carcinoma of the head of the pancreas (23). Studies have shown that the painful features of the disease are numerous and variable. Pain has been reported in from 40 to 85 per cent of cases. Walters and Snell (24) distinguished three types of distress. The important fact to be emphasized is that pain of some character has been noted by practically all observers in a high percentage of cases. When the lesion involves the head of the pancreas (75 per cent of the cases), jaundice is practically always present.

Cachexia and weight loss usually are symptoms of advanced carcinoma. With carcinoma of the body or tail of the pancreas the problem of diagnosis not infrequently is insoluble, except following exploratory laparotomy or autopsy.

The growth may be relatively symptomless until the enlarging tumor or metastatic lesions have become manifest.

In the absence of obstruction of the common bile and pancreatic ducts, as in carcinoma of the body or tail of the pancreas, the diagnostic value of laboratory data is negligible. X-ray demonstration of the neoplasm is difficult in its early stages. Many physicians are under the impression that cancer of the pancreas can only be diagnosed by x-ray examination when it has enlarged or distorted the duodenal loop. Such changes are more common with pancreatic cyst or pseudo-cyst. Results of careful x-ray study should arouse suspicion of a pancreatic lesion in 25 per cent or more of patients who eventually prove to have cancer of the head of the pancreas. Beeler and Kirklin (25) state that in roentgenographic studies of pancreatic carcinoma a mass may be palpated during the examination, and this may distort or obstruct the duodenum or produce a filling defect which usually involves a short segment of the bowel. This deformity is rather sharply demarcated and frequently alters or obliterates the mucosal pattern; it is usually situated on the concave aspect of the first or second portions of the duodenal loop. The irregularity is due to invasion or adhesions of the mass of the tumor. With obstruction or narrowing due to pressure or invasion, a dilatation of the proximal segments occurs. A filling defect is best seen on the lateral view in the case of those lesions of the body and tail which, because of their mass, produce by pressure a smooth indentation of the lesser or greater curvature of the stomach. Diffuse involvement of the pancreas will also produce this manifestation. Primary carcinoma of the ampulla of Vater and of the duodenum give the same x-ray appearance and must be differentiated from carcinoma of the pancreas and benign duodenal ulcer. Berk (26) states that 37 per cent of proven cases of carcinoma of the pancreas can be diagnosed by x-ray examination. Beeler and Kirklin (25) claim 41.9 per cent correct diagnoses, and MacKinnon (27) claims 71 per cent. Duodenal ulcer is associated with this lesion in 5 to 10 per cent of the cases.

Bockus (28) states that 12 per cent of patients with carcinoma of the pancreas have a clinical picture of peptic ulcer. He urges that when patients with a diagnosis of duodenal ulcer are re-rayed, the roentgenologist look for evidence of pancreatic carcinoma. Dashiel and Palmer (29) have also noted that carcinoma of the pancreas may not be suspected because of symptoms and x-ray findings interpreted as due to a duodenal ulcer. Whipple (30) advises the use of a double-lumen tube to aspirate duodenal contents. The presence of blood or the absence or decrease of bile and pancreatic ferments suggests carcinoma of the pancreas. Papanicolaou smears may corroborate the diagnosis. In the last 23 cases of proven carcinoma of the pancreas at our hospital, only 1 was clearly demonstrated by gastrointestinal x-ray studies. Three patients were thought to have a lesion of the stomach, and in 2 the diagnosis was duodenal ulcer. In cancer of the head of the organ, the onset of jaundice suggests the diagnosis and hastens surgical exploration. Even at operation, the correct diagnosis of cancer of the pancreas is not easy, unless unquestionable metastases are found in the neighboring glands or liver. *Chronic pancreatitis* may transform portions, or all of the

gland into a nodular mass with a consistency as hard as carcinoma. Indeed the two processes may co-exist and even biopsy of the hardest areas may be of doubtful value. On more than one occasion, we have performed a biopsy on a hard nodular mass in the pancreas and have had the diagnosis reported as chronic pancreatitis—in a patient who later died from a pancreatic carcinoma, found at autopsy.

Pancreatic cysts, or the more common pseudo-cysts, present diagnostic difficulties. They usually involve the tail or body of the organ and produce pain in the great majority of cases. The pseudo-cysts follow an attack of acute pancreatitis from which the patient often appears to have largely recovered by the time the mass is detected. They may follow trauma to the upper abdomen. They produce smooth distortions or displacements of the adjacent hollow viscera, as revealed by x-ray studies. This is in contrast to the irregular defects in these organs produced by carcinoma. True pancreatic cysts are usually cyst-adenomata. These, and the pseudo-cysts which do not disappear spontaneously, are eventually diagnosed and treated, as a rule, by surgical exploration.

Tumors of the kidney are a less difficult diagnostic problem. Pain or a mass in the loin, and hematuria, give the clue and a retrograde pyelogram generally establishes the diagnosis. When sizable, kidney tumors project forward and downward, rarely posteriorly, and are palpable on bimanual examination. They may be movable or fixed in position. Retrograde pyelograms are of course essential in the study of all retroperitoneal masses. In our experience, cancer of the pancreas is much more frequent than renal tumor.

Tumors of the adrenal gland are a rare form of retroperitoneal neoplasm. When large, they are usually confused with primary lesions of the kidney. When small, the diagnosis may be suspected by the presence of the adrenogenital syndrome, and proven by determination of urinary estrogen and 17-ketosteroid excretion. A large percentage of true adrenal neoplasms, as contrasted with cortical hyperplasia, are highly malignant. The well known neuroblastoma, occurring usually in children, may be mistaken for a Wilm's tumor of the kidney.

The neoplasms which arise from the *other retroperitoneal tissues* afflict either sex at any age, showing no discrimination in regard to racial, geographic or climatic factors. Although all authorities agree that the greatest incidence is between the fourth and sixth decades of life, teratoid masses have been described in infancy and sarcomas have been reported in persons ranging in age from 1 to 78 years. According to the surveys of Slagerman (31), Judd and Larson (21), Mayo and Dixon (32) and Pemberton and Whitlock (33), sarcomatous neoplasms predominate in the male, whereas the incidence of lipomatous and benign tumor is greater in the female.

DIAGNOSTIC AIDS

During their development, retroperitoneal tumors may displace any of the abdominal viscera away from the posterior abdominal wall (Figs. 1–7). Secondarily these tumors may extend into the mesentery of the large and small intestine, as well as downward, over, or alongside the promontory of the sacrum,

into the pelvic connective tissues and sigmoid mesocolon. They have been known to grow into the inguinal canal, labia and buttocks, and through the obturator foramen. The symptoms accompanying retroperitoneal tumors depend largely on the rapidity of their growth, whether they encroach on other organs, and the extent and nature of their metastases. Early symptoms are usually of vague

FIG. 1. Displacement of transverse colon downward by retroperitoneal sarcoma.

FIG. 2. Displacement of transverse colon upward by retroperitoneal lipoma.

digestive disturbances and include malaise, anorexia, heart burn, eructation and constipation. Progressive losses of weight and of strength are the rule. The onset of subjective symptoms may be easily overlooked or disregarded, particularly if the tumor is small. Because retroperitoneal tumors generally grow slowly, symptoms may be transitory and indefinite until pressure factors develop or vital organs are invaded. Later complaints, referable to the digestive tract, frequently consist of epigastric distress, nausea, vomiting and abdominal pain.

Symptoms may be preceded by the observation of a mass. Pain is generally abdominal, but may be located in the lumbar region. Although usually a dull gnawing discomfort, it may be sharp lancinating and colicky. As the tumor extends, local disturbances supervene, due to pressure on the lumbar or sacral

FIG. 3. Displacement of sigmoid colon by retroperitoneal sarcoma.

FIG. 4. Displacement and deformity of stomach by retroperitoneal sarcoma (lateral view).

nerve plexuses or on the venous system. Varicose veins, varicocele, hemorrhoids, or neuralgic leg pains with or without edema, may develop. In one of our patients, the most marked early symptoms were swelling and cyanosis of the leg and he was treated elsewhere for varicose veins before the lower abdominal mass was discovered. It is obvious that the development of evidences of venous ob-

struction in the legs should call the physician's attention to the possibility of an abdominal new growth of some type. The rapid development of a varicocele

FIG. 5.

FIG. 6.

FIG. 5. Deformity of bladder caused by retroperitoneal pelvic fibrosarcoma.
FIG. 6. Deformity of right renal pelvis and displacement of ureter by huge carcinoma of right kidney.

FIG. 7. Deformity of duodenum caused by large carcinoma of head of pancreas (posterior-anterior view).

or hydrocele should also arouse suspicion concerning the possibility of a renal or perirenal neoplasm of the same side (34).

A difference in the skin temperature of the legs may suggest a retroperitoneal mass compressing the lumbar sympathetic nerve chain on the warmer side (1, 8). Careful physical examination with the patient in various positions may indicate

whether the mass is retroperitoneal and fixed in position, or is intra-abdominal and movable. Vaginal and rectal examinations are always indicated.

Interference with the function of the bladder or rectum may simulate disease of the prostate gland. With extension of the mass, pressure symptoms referable to the kidneys, ureters and gastrointestinal tract develop frequently. Considerable neoplastic expansion may take place before the lesion is apparent. It may first be discovered on a routine examination. Constitutional symptoms, such as progressive loss of weight and fatigue are invariable. Ascites, jaundice, low-grade fever and bloody stools may occasionally be present. In some cases, acute abdominal symptoms have occurred due to intestinal obstruction, peritonitis, intra-abdominal rupture or hemorrhage. Sweetser (35) has reported a death due to uremia, because of bilateral ureteral blockage. The slow growth and the adaptability of the soft fatty tissue to the contour of the surrounding structures may provoke no symptoms in the early stages. If the tumor achieves larger proportions, its weight may cause abdominal distress, a sense of fullness, and occasionally constipation and backache.

Lipomas are frequently multiple and one or more in the retroperitoneal spaces may be associated with others in the inguinal canals (8), in the buttocks, about the shoulders or elsewhere in the body (36). A lipoma may be continuous with one in the scrotum, or it may originate in the thigh and gain access to the retroperitoneal space by way of the femoral or obturator canals (11). Superficial hemangioma may be associated with retroperitoneal cavernous hemangiomata (16).

Rabinovitch (37) noted pain in 70 per cent of all retroperitoneal tumors and in 90 per cent of the malignant ones. The duration of symptoms varied from two weeks to ten years with an average of two and a half years. All of his patients had a palpable abdominal mass, fixed or movable and often tender. Patients with the shortest delay in seeking aid offered the poorest prognosis and presented the largest and most actively growing neoplasms at the time of operation. Palumbo *et al.* (5) noted that it is not uncommon to find dilation and prominence of the veins of the anterior abdominal wall following establishment of a collateral circulation. Retroperitoneal tumors may transmit aortic pulsations.

The loose retroperitoneal areolar tissues allow these neoplasms to grow readily with gradual displacement of gastrointestinal and urinary tracts. This explains the x-ray evidence on which the diagnosis can usually be made. When an abdominal mass is suspected or is palpable, the roentgenologist is depended upon for the correct diagnosis, and this can generally be made by a proper study. A primary lesion of the gastrointestinal tract must be ruled out first, and this problem should not be difficult with our modern roentgenographic techniques. Air contrast studies and films made with the patient in different positions, usually reveal the relation of the lesion to the gastrointestinal tract. In cases of retroperitoneal tumor, the stomach is frequently displaced and shows a pressure deformity of the greater or lesser curvature. The transverse colon may be displaced and the right or left colon pressed far out of normal position (14, 38). Most of the loops of small intestine may be found to occupy one side of the abdomen or be grouped in the pelvis. The diaphragm may be elevated (11).

A pyelographic study (39, 40, 41) may be the keynote to the diagnosis and intravenous pyelograms are made first. These frequently show a marked alteration in the location of the kidney, due to the frequency with which retroperitoneal tumors arise in the perirenal tissues (34, 36). The kidney pelvis and calices may be distorted or displaced and rotated, as seen on antero-posterior and lateral views. The ureter may be found out of position and curved as it passes around the tumor on the lateral, medial or anterior (3) sides. Psoas muscle shadows may be obliterated and the urinary bladder displaced (42). If there is any question as to whether the lesion is renal or perirenal, retrograde pyelograms are usually necessary for more accurate diagnosis (3). Good pyelograms and excretory studies to determine the function of both kidneys are advisable for another reason. If an attempt is to be made to remove the mass, the surgeon should know the function of both kidneys, since it is often necessary to perform nephrectomy in the successful removal of a retroperitoneal tumor.

The soft-tissue outlines of the mass, as seen by x-ray examination, may be of diagnostic value. A fatty tumor has a greater radiolucency than a mesenteric or ovarian cyst, or a lymphosarcoma (2). The denser tumors, if solid, are more apt to be malignant.

Retroperitoneal air injections are to be condemned (3, 34). They are often of diagnostic value, but the technique is not easy, the interpretation of the films is subject to error, and there is a real danger of air embolism. There has been a renewed interest recently in the use of retroperitoneal oxygen injections into the tissues above the coccyx in the hollow of the sacrum. This area is devoid of large vessels and vital organs. From 800 to 1000 cc. of oxygen will usually visualize the psoas muscles, kidneys, adrenals, liver and spleen (38). Several authors in recent years (43, 44, 45) have reported on large numbers of patients who have been subjected to this procedure with no complications such as hemorrhage or air embolism. It thus appears to be much preferable to pneumoperitoneum or perirenal air insufflation. It may be combined with pyelography if desired.

Aortography and phlebography have been used to demonstrate abnormalities in the abdominal blood vessels. A spinal puncture needle may be passed below the left twelfth rib, upward and inward into the aorta. With the patient under pentothal anesthesia and prone on the x-ray table, the contrast medium can be rapidly injected and films made. It is thus possible to demonstrate the position and patency of the abdominal aorta and its major branches. Puncture of the aorta, even when that vessel is altered by syphilis or atherosclerosis, is rarely followed by any significant hemorrhage. Injection of the solution into the superior mesenteric artery has been known to cause mesenteric infarction with fatal results (46, 47). The possibility of a sensitivity reaction to iodine may be reduced by using 70 per cent Urokon sodium (48). Peirce (49) reports that arteriographic results may be improved by the simultaneous use of retroperitoneal oxygen insufflation. He states that many abdominal masses pulsate by transmission; aortography allows a possible diagnosis of aneurysm when this pulsation is present. It is not always possible to differentiate a retroperitoneal mass from an enlarged spleen, but this can be done with certainty by identification of the

splenic artery supplying the mass. Adrenal masses frequently are small, but they may show sufficient irregular increase in vascularity to permit their identification; occasionally the findings closely resemble those of a nephrogram. In the case of renal masses, arteriography not only permits identification of the kidney as the offending organ, but often allows a more precise diagnosis. Hypernephroma generally shows pooling of the contrast medium, probably in areas of necrosis, and this may sometimes be seen in the absence of pyelographic abnormalities. This pooling may also permit a differential diagnosis between cysts and neoplasms. When the questionable mass does not arise from the aorta, iliac artery or kidney, these organs may generally be excluded on the basis of arteriography. Perinephric or renal-space lesions may be indistinguishable from a true renal lesion by physical examination and the usual diagnostic procedures. Although these masses may not show any characteristic vascularization, the arteriogram, by disclosing a normal renal vascular pattern and outline, may unequivocably exclude the kidney as part of the mass. A defect in the nephrogram may suggest that the perirenal mass has its origin in a renal lesion.

The retroperitoneal mass may be outlined by arteriography in cases of tumors with increased vascularity. Here the dye may show pooling and assist both in outlining the mass and in its precise diagnosis. Usually, however, the mass is revealed aortographically only when there is aortic or iliac displacement and this may not occur unless the mass is large. In general, displacements of the aorta and its large branches are more difficult to interpret than corresponding ureteral displacements; nevertheless, they may be quite helpful.

Percutaneous catheterization of the aorta via the femoral artery, under local anesthesia, allows accurate injection of the contrast medium with the patient in any position and is the most satisfactory method available (49).

The information obtained by any or all these procedures in cases of retroperitoneal tumors is at best only confirmatory of other clinical evidence usually of more diagnostic value.

Laboratory studies are seldom of much value in the diagnosis of retroperitoneal tumors (3, 34). A badly distorted kidney may still secrete normal urine. Some anemia may be found if the mass has produced nutritional complications. The blood or bone marrow picture should reflect a leukemic form of massive abdominal lymphadenopathy.

The differential diagnosis involves consideration of the intra-abdominal lesions characterized by tumor masses. Tumors and cysts of the uterus and ovaries may develop in the retroperitoneal spaces and extend upward. Pregnancy, hepatomegaly, splenomegaly, metastatic carcinoma, tuberculous peritonitis, abdominal Hodgkin's disease, ascites from various causes, pseudo-cysts of the pancreas, hydronephrosis, aneurysms, the very rare omental tumors, polycystic kidneys, perinephric abscess, solitary cysts and tumors of kidneys, or a urachal cyst may at all times require consideration. Retroperitoneal collections of blood, pus or urine may simulate a tumor mass. The final and correct diagnosis can only be made at operation—or autopsy in many cases (34, 42, 50, 51). The earliest operation for retroperitoneal tumor was reported in 1824 by Lizars (52) who

thought he was dealing with an ovarian tumor, a mistake often repeated. He was encouraged to proceed after hearing of E. McDowell's successful ovariotomy (8). The surgical extirpation of large retroperitoneal tumors may be either comparatively simple, extremely difficult, or impossible. Only from experience and knowledge of pathology can the surgeon determine correctly which tumors are resectable, and which are not. Resectability rates vary in reports of different authors from 28 per cent (1) to 86 per cent (8). It is obvious that many factors determine resectability and many statistics are misleading and worthless. The same may be said regarding surgical mortality, which has been reported to be from 8.3 per cent (8) to 25 per cent (1, 11). Of the tumors which cannot be removed, a large percentage prove to be radiosensitive (21, 36).

SUMMARY

The correct diagnosis of retroperitoneal tumor should be made in the majority of cases by a thorough physical examination and by careful x-ray studies of the gastrointestinal and urinary tracts. Retroperitoneal oxygen insufflations and aortography are useful adjuncts in some cases. In the remainder, the final diagnosis will depend upon surgical exploration.

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APPLICATION OF PLASTIC SURGICAL PRINCIPLES TO THE TREATMENT OF CANCER

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The purpose of this paper is to call attention to the advances made by the plastic surgeon in a more effective and less disabling treatment of cancer. Plastic surgical methods are generally applicable in immediate or late repairs following the removal of cancer of the skin or mucosal surfaces of the body, particularly of the head and neck, and in the closure of wounds resulting from the removal of cancer involving deeper tissues. Effective treatment of cancer, regardless of the method, is of necessity destructive. The focus of disease and an adequate margin of normal tissue must be eradicated. Regional lymph nodes, if involved, must be removed either in conjunction with the destruction of the primary lesion or at a secondary procedure. Functional and cosmetic deformities inevitably result. The understandable reluctance of the surgeon to accept these disabilities and deformities in exposed parts may lead to the selection of less effective nonsurgical methods of treatment or to inadequate surgical ones (Fig. 1). Adequate surgery, sometimes ominously termed radical, may finally have to be accepted, but only after the favorable prognosis of early surgical excision has been forfeited by ineffective initial treatment. As the surgery of cancer has progressed, both physician and patient have learned to accept the limitations of the absent lung, the nutritional consequences of a total gastrectomy and the annoyance of a colostomy, because the incidence of cure is greater when these procedures are employed. The physician and patient must be prepared to accept the deformities which may follow adequate primary excisions in exposed parts. At the same time the contributions in recent decades to a more rapid and effective surgical repair should be recognized and utilized.

Abnormal new growths of the skin of the face or neck and of the lining membranes of the oral and nasal passages are common in the elderly. These may be senile keratoses or leukoplakia (which are precursors of cancer) or they may be well defined cancer. Diagnosis may be confusing because the skin and mucous membranes in their natural aging process tend to become dryer, hyperkeratotic and more pigmented. The benign aging process may in some cases be difficult to distinguish from an early neoplasm. The diagnosis of cancer must be entertained whenever any lesion becomes ulcerated, when it persists in crusting and re-crusting in spite of adequate lubrication, or when it enlarges steadily. Pain is not an early symptom. Not infrequently, however, the final differentiation must be made by microscopic examination of removed tissue.

The two common types of skin cancer are basal-cell carcinoma and epidermoid

Received for publication July 3, 1953.

carcinoma. A basal-cell carcinoma is usually circular with an elevated pearly border and a crusted or ulcerated center (Fig. 6a). It is locally destructive and may spread in all directions, even invading the underlying bone or cartilage (Fig. 1). An epidermoid carcinoma has a ragged ulceration that may be flat with deep induration or may be very bulky and project from the surface. It not only invades local tissues, including bone, but may spread very early to the regional lymph nodes (Figs. 3a and 9a).

Epidermoid carcinoma is the most common cancer of the oral and nasal membranes. An ulcer or a mass is usually the first evidence in these areas. The lesions may appear on the lip, tongue, floor of mouth, alveolar process, tonsil, palate, or nasal or pharyngeal membranes. They may be in the form of shallow ulcers with deep penetration, or of bulky protruding masses. All metastasize to regional lymph nodes. The character of the primary lesion and the rapidity of node

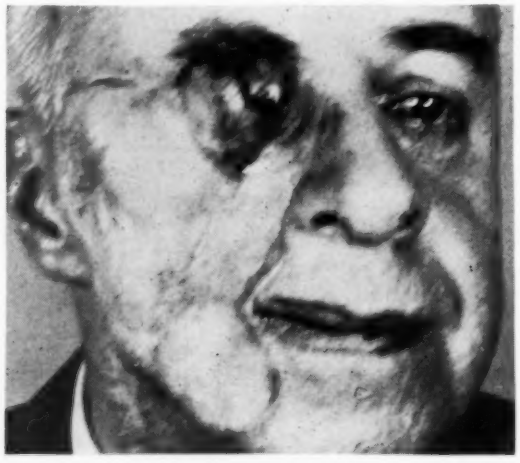

FIG. 1. Basal-cell carcinoma of cheek treated eighteen years ago by x-ray and radium without effective control of the lesion. The late functional and cosmetic deformities resulting from eleven operations might have been avoided by adequate primary surgical removal.

involvement are of prognostic significance. For example, lesions of the lip metastasize less frequently and later than those of the tongue and floor of the mouth. The latter are thus more difficult to cure.

If in doubt about any intra-oral or surface lesion, a biopsy will establish the diagnosis. In smaller lesions it may be advisable to perform excisional biopsies, removing the entire specimen. Such biopsies must be executed with margins adequate for good cancer surgery (Fig. 2). Small biopsy specimens from the margins of the lesion, including a bit of the lesion and of adjacent skin, are superior to an inadequate excisional biopsy specimen which requires a secondary excision more deforming and less effective for cure than adequate primary excision.

Having established the diagnosis of cancer, the surgeon has two responsibilities. He must eradicate the disease and minimize the resulting deformity.

Surgical excision is preferable to x-ray therapy and electrodesiccation in most of these lesions for the following reasons. The cancer is removed from the body.

A clean specimen is available to the pathologist for study. The probability for cure equals that of other types of therapy. Regional lymph nodes, if involved, can be eradicated in conjunction with removal of the primary lesion. This cannot be over-emphasized, because surgical excision is the most effective way of dealing with metastatic nodes (1), and if both the primary and metastatic lesions can be removed at the same operation, patient morbidity and hospital time can be minimized. Finally, a properly executed reconstruction following surgical excision provides a superior functional and cosmetic result (2, 3).

A surgical cure demands the excision of adequate lateral margins of 1 centimeter or more of normal tissue. The deep limit of the excision must also include a sufficient margin of normal tissue. Recurrent disease may originate from residual cancer cells in the base of the wound.

Wound closure should be carried out by the most direct method. Primary surgical closure is simplest. By planning the excision in, or parallel to the normal

a b

FIG. 2. Excision of basal-cell carcinoma and primary closure in line of normal skin creases.

facial lines, the resulting scar is less noticeable (4). Good healing of the wound depends on closure without tension, accurate approximation of skin edges, atraumatic handling of the skin, and the insertion of fine suture material (Fig. 2).

A lesion too large for primary closure may be repaired by a pedicle flap from an adjacent area. These flaps of skin and subcutaneous tissue with their blood supply preserved have the same color and texture, are readily available, and are indicated when their use does not create additional deformity. The concealing of a recurrence by a flap is not a contraindication to its use, if the excision has been adequate (Figs. 3 and 4).

Cancer of the lower lip may be excised as a wedge, with primary closure. For a more extensive resection of the lower lip, immediate repair can be accomplished by the use of a vermilion-bordered lip flap (Fig. 5) (5).

The most commonly used method for closure of defects too large for primary suture or local flap repair, is the free skin graft. A free skin graft cut from another part of the body, with its blood supply completely severed, may be either

full thickness or split thickness. A full-thickness graft includes all layers of skin but no subcutaneous fat. A split-thickness graft includes the epidermis and varying thicknesses of the dermis. The full-thickness graft is selected for better function and color match (Figs. 6 and 7). The split-thickness graft, even though inferior in color match and pliability, may be preferable for larger defects (Figs.

a b

FIG. 3. Total excision of upper lip for epidermoid carcinoma uncontrolled by radiation. Closure with direct flap from the cheek in one operation, under local anesthesia. Hospitalization three days.

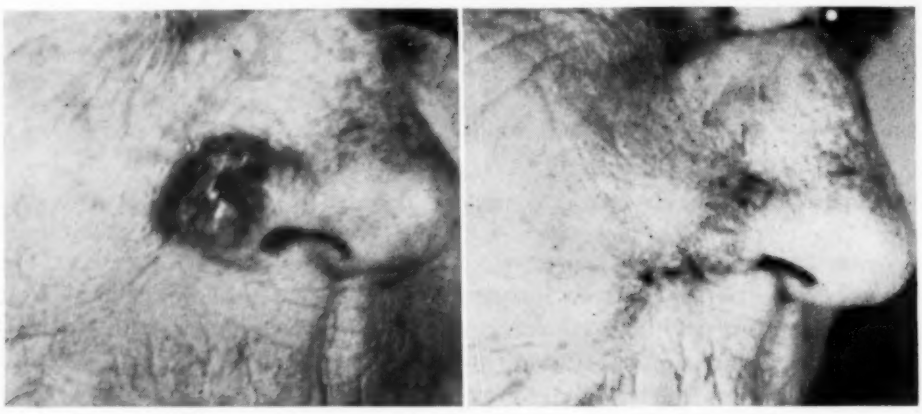

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FIG. 4. Basal-cell carcinoma of ala excised. Repair with direct flap from cheek. One operation, local anesthesia.

7 and 8), because the spontaneous re-epithelization of its donor site avoids the creation of a secondary deformity.

Most skin cancers can be treated by the foregoing methods. In a single procedure, often carried out under local anesthesia, the diagnosis is established, the disease is eradicated and the defect is reconstructed.

Extensive or recurrent cancer may require the use of more complicated methods of plastic surgery for their cure and repair. The same principle of ade-

quate excision and of planned repair, either primary or secondary, applies. Concern with the repair must never divert the surgeon from his objective—eradication of the disease.

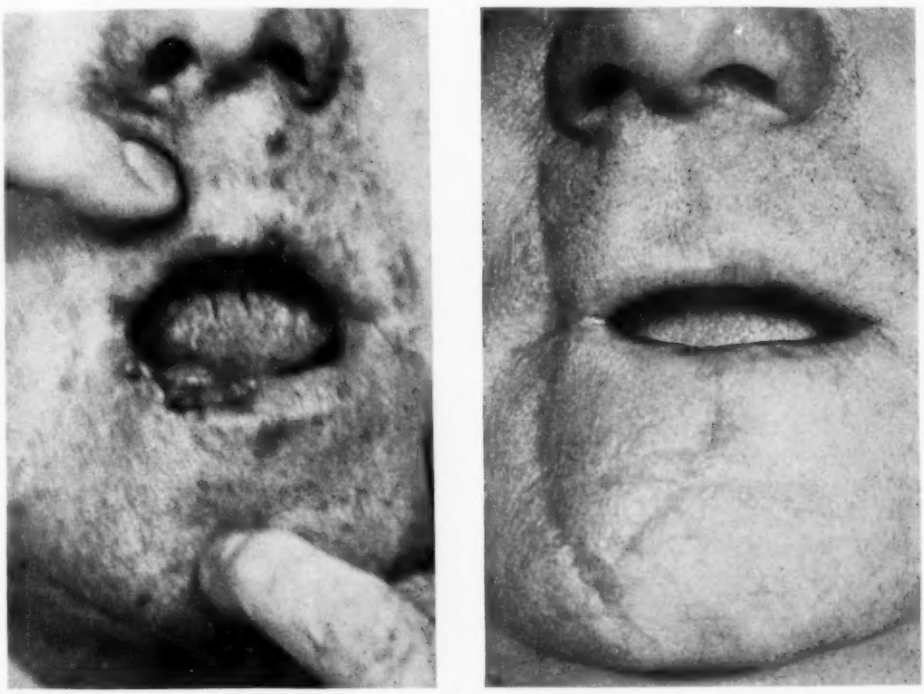

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FIG. 5. Epidermoid carcinoma of lower lip excised. Wound, too large for primary closure, repaired by vermilion bordered flap rotated from upper lip (By permission of *Surg., Gynec. & Obst.* (5)).

a b

FIG. 6. Basal-cell carcinoma of inner canthus, excised and repaired with full-thickness graft in one operation. Functional superiority of full-thickness graft necessary in lid area.

Cancers of the tongue, of the floor of the mouth, and those involving the alveolar ridge, have a high morbidity and a low percentage of cure. By combining radical excision of the primary and metastatic disease with sound methods

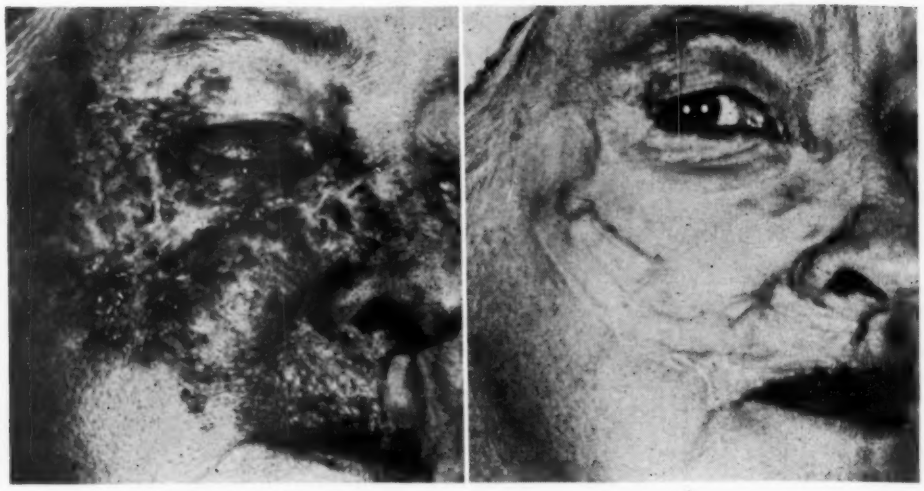

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FIG. 7. Capillary hemangioma treated by radiation in childhood. Appearance of hemangioma unaltered. Later, carcinoma developed in irradiated area, requiring excision of most of skin of cheek. Immediate repair with split-thickness skin graft. Ectropion of lower lid corrected at second operation with use of full-thickness graft.

a b

FIG. 8. Radiation-resistant baso-squamous carcinoma of left temple excised. Deep margin included temporal muscle and pericranium. Repair at same operation with split-thickness skin grraft.

of reconstruction, the outlook for today's patient is more hopeful. The likelihood of cure is greater, the duration of treatment shorter and less disabling, the rehabilitation more rapid, and late complications less likely.

For example, cancer of the tongue and floor of the mouth, which frequently metastasizes early to the regional nodes, can be excised surgically in conjunction

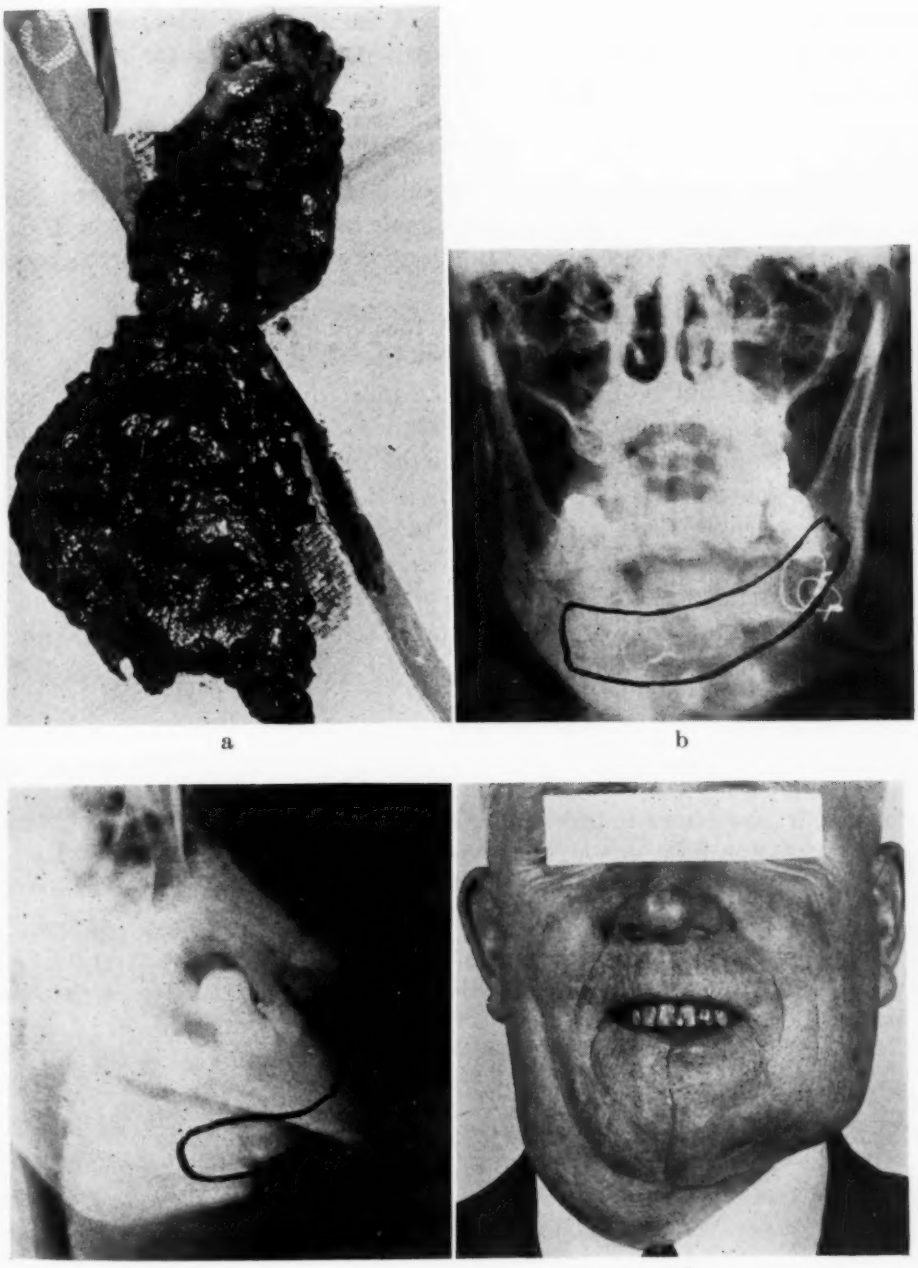

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FIG. 9. Epidermoid carcinoma of side of tongue, floor of mouth, and alveolar ridge, with cervical nodes involved. Excision of primary lesion, adjacent mandible, and radical neck dissection performed in continuity. Iliac bone graft replacement carried out immediately. One operation; hospitalization three weeks. Final photograph was taken two months post-operatively. Patient working at former job and free of disease sixteen months later.

with the necessary neck dissection in one operation. Resection of a segment of mandible may be necessary in order to secure an adequate margin. Resection of a segment of mandible is always indicated in cancer of the mucous membrane

of the alveolar ridge. Whenever continuity of the mandible is broken by removal of a segment, a bone graft can be substituted immediately. Thus function of the mandible can be re-established (Fig. 9).

SUMMARY

Cancers of the skin and mucous membranes of the face and neck are common in the elderly. A diagnosis can usually be made on clinical examination. If doubt exists, the tissue should be subjected to biopsy or totally removed for microscopic study.

Surgical excision offers a greater chance for cure and, if the methods of plastic surgery are used, less deformity and morbidity than other forms of treatment. Wound repair should be executed by the most direct method. Local pedicle flaps provide skin of similar color and texture for wounds too large for primary suture. Free skin grafts for lesions too large for local flaps can be either full thickness or split thickness. Size and location of the raw surface to be closed are the major criteria for choice between these two types of graft.

Extensive or recurrent cancer requires more complicated plastic surgical methods for cure and repair. For intra-oral cancers requiring removal of the mandible, immediate bone graft replacement following excision of the primary and metastatic disease restores mandibular function.

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SOME PROBLEMS PRESENTED BY HEAD INJURIES IN OLDER PEOPLE

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In the increasing tempo of American mechanized life, the diminishing alertness of the aging individual, and his less efficient physiologic adjustments, militate against him in the struggle for physical survival. If our youth and some of their elders could be taught the truth of the adage emblazoned over the rear of our traffic officers' cruisers, that "Death begins at forty," and if older people acting as pedestrians would be more alert, the incidence of head injury could be very significantly reduced. Even with the application of such measures, there will still be the multiple problems of head injury to be faced and it is the physician's responsibility to be prepared to meet them.

It is not the purpose of this paper to discuss either lacerations of the scalp—which may, on occasion, present formidable problems—or the matter of skull fractures. Rather it is our intent to concentrate upon those two very important categories of injury which affect brain function itself, namely, compressing clots and direct brain injury.

Although it is true that an extensive depressed skull fracture may play a role in brain compression, no more than passing comment upon this point is required. However, the usual lesions which cause shift of brain substance are the epidural and subdural clots and frequently, of no less importance, the development of a hematoma within the brain substance itself. Since the subarachnoid spaces are inaccessible surgically, and since the potentially phagocytic cells which line these spaces tend to dispose of hemorrhage, we do not need to be detained over a consideration of subarachnoid hemorrhage.

COMPRESSING CLOTS

We may then restrict our discussion of meningeal bleeding to the epidural and subdural clots, indicating that in each instance essentially the same morbid physiologic effects follow, regardless of the side of the dura upon which the clot accumulates. There are, however, certain definite differences in the nature of these clots which it would be well to point out. In most instances of epidural hemorrhage, the blood is derived from a tear in the middle meningeal artery, and the blood, dissecting under an arterial head of pressure, strips the dura from the undersurface of the skull. This requires the expenditure of a certain amount of energy and the clot tends to be somewhat limited, depending in part upon the size of the vessel which is torn. In contrast, the subdural space is a potential cavity extending over the entire hemisphere, and bleeding into it tends to be much less restricted.

Received for publication May 18, 1953.

There is a further difference in the character of the two forms of hemorrhage, epidural and subdural, which is worthy of note, and this is the rate of accumulation of the clot. In epidural hemorrhage of arterial origin, the accumulation occurs characteristically in a relatively brief period of time, perhaps in the course of fifteen minutes, a half-hour or an hour. On the other hand, subdural hemorrhage, usually of venous origin, may accumulate over a longer period of time, and may spread into a potentially greater space. This is a matter of considerable importance in understanding the clinical picture, because it is a cardinal neurologic principle that compression which is rapid disturbs brain physiology to a greater degree than does slower compression of the same extent. This last consideration relates particularly to the matter of subdural hematoma, for there may be several potential sources of bleeding.

When direct bruising force is sustained by the surface of the brain, the contusion of the cortex may disrupt the pia arachnoid and may permit a torn cortical vessel to bleed directly into the subdural space. If the vessel is a small venous radicle, the resultant hemorrhage may be small and insignificant. If a large cortical vein is torn, an appreciable clot may develop in the subdural space, or if a sizable artery over the surface of the brain is torn, the bleeding may be extensive and may be relatively rapid in its accumulation. Profound degrees of disruption of brain activity may result in the last instance, whereas it is quite possible in the case of the venous bleeding, that tamponade may occur before a clot of sufficient size is accumulated to cause appreciable brain compression. Under these circumstances, the stage is set for the later development of a chronic subdural hematoma, for free blood in the subdural space is poorly tolerated. An encircling capsule is set up around the blood clot and in the course of time the resultant hematoma membrane, with its incorporated, disintegrating red blood cells, may serve as a tardily developed space-consuming lesion, which may suddenly and with relatively little warning give evidence of its presence weeks or even months following the injury.

Probably the more common source of such bleeding into the subdural space is the bridging veins which traverse the subdural space to enter one of the major venous sinuses. It would appear that it is most frequently those veins entering the median longitudinal sinuses that are subject to tearing; but certainly, on occasion, vessels at the base may similarly be subjected to undue strain when the brain, moving freely within the dural encasement, overstretches a tributary entering one of the basilar sinuses.

It is proper to think of epidural and subdural clots as fitting into a temporal spectrum of compression. The rapid accumulations which usually collect in the epidural space give rise to early, dramatic neurologic manifestations. Acute subdural hematomas may manifest their presence in the course of the first twelve to twenty-four hours, though sometimes they appear sufficiently early to be readily confused with the epidural accumulations. On the other hand, the subdural accumulation may not be quite so rapid in its development and may fall into the group of subacute clots manifesting their presence in the course of a few days or a week. Finally, then, there are the lesser accumulations of blood in

the subdural space, which become encapsulated and manifest their presence only as they come to act as space-consuming lesions on a quite different basis—that of breakdown of intracapsular contents, with resultant swelling of the sac because of osmotic action. This sequence may precipitate a compressive crisis at a relatively late date, in weeks or months, and rarely as late as a year after the injury presumed to have caused the bleeding.

What exactly are these compressive effects that are produced as the result of such changes? Perhaps the initial dysfunction is an interference with the circulation of the hemisphere beneath the clot, leading to swelling of the hemisphere. This has a twofold effect. In the first place, it appears to interfere with the normal activity of the nerve cells, with the result that a common early neurologic difficulty is the development of weakness of the opposite side of the body, since the clots usually accumulate over the parietal convexity. The weakness usually becomes manifest in the contralateral hand, for the hand area has a strikingly wide distribution in the cortex. The weakness may then spread to involve the leg and the face, so that a well defined hemiparesis results, proceeding to hemiplegia.

The second effect of the hemispheral swelling is that the increased bulk of the hemisphere adds its effect to the space-consuming action of the clot, with the result that the midline structures of the brain are shifted and the normal relationships of the hemispheres (and more particularly of the brain stem) become distorted. It is probably at this stage that the lethal vascular mechanisms begin to develop, so that if the clot is not promptly evacuated, irreversible changes occur in those areas of the brain stem subserving vital function. The exact nature of the circulatory changes which occur in the diencephalic midbrain regions has not been finally settled. There are those who believe that these changes are of arterial character. It is our own belief that they more probably represent interference with venous outflow from these areas. A profound shift of the mesial portion of the temporal lobe against the midbrain structures is a well understood mechanism. Under these circumstances, the cleft between the temporal lobe and the midline structures is obliterated and it seems wholly credible that the thin-walled veins suffer serious compression. When the displacement occurs rapidly, the opportunities for development of collateral circulation may be meager indeed.

Deepening coma is not the only sign of a disturbance in this region. Decerebrate rigidity has long been recognized as a classic manifestation of brain-stem injury. When it is immediate, or almost immediate in its onset, it may be attributed to direct brain-stem injury, but when its onset is delayed for hours, or longer, it is reasonable to assume that it signifies a space-consuming lesion. One must not presume that increased intracranial pressure is an invariable, or even frequent, sign of a space-consuming lesion.

Lesions produced in this area of the brain may give rise to impaired function in the cranial nerves in the vicinity, notably the third or oculomotor nerve, which controls the size of the pupil, the elevation of the lid and most of the extraocular muscle movements. Hemorrhage into the region of the third-nerve nuclei presumably is the result of venous back pressure hemorrhages and may account

for unilateral, contralateral or bilateral third-nerve signs. By way of diagnostic recapitulation, what may then be said concerning the recognition of such lesions? Both epidural and subdural clots may result from very minimal injury, with the incident often passing unrecognized by the patient or, in the case of a longer lasting lesion, possibly having been forgotten. If the possibility of a space-consuming lesion is borne in mind, the symptoms and signs take their proper place. Headache may or may not be a prominent symptom. Most important are the signs of hemispheral dysfunction, usually manifested by hemiparesis progressing to hemiplegia, and of brain-stem dysfunction, usually manifested by deepening coma and by upper cranial nerve signs generally involving the oculomotor nerve.

When it is further recalled that there is a time spectrum of clot development one will not insist upon a rigid schedule for the appearance of symptoms and signs, but rather will maintain a dynamic open mindedness concerning them.

The space-consuming action of the clot may act with lifetaking suddenness. This is particularly true in the case of a rapidly developing epidural hematoma, but it may at times be almost equally true when the decompensating changes, associated with a late chronic subdural hematoma, manifest themselves. In general, it is imperative that therapy be instituted at the earliest possible moment and that no delay be brooked.

Treatment is obviously directed at the evacuation of the clot, and although this is a procedure to be undertaken by the neurologic surgeon or the general surgeon with special training in this field, the physician carries a heavy responsibility in seeing to it that the patient reaches competent surgical hands with a minimum of delay. In some instances, even in well organized neurosurgical centers, it may not be possible to process the patient quickly enough to achieve evacuation of the clot in time to save the patient's life, such is the urgency of the situation.

Granted, however, that it has been possible to achieve removal of the lesion, the battle is but half won, for in most of these instances, such patients are very ill and the utmost in good nursing and supportive care is demanded. It is frequently forgotten that following profound neurologic injury, a patient is reduced to the status of an infant, needing all of the care and attention which an infant demands, but requiring also the additional help and strength necessary for a large, helpless body. Failing adequate nursing assistance, the use of a Stryker frame may on occasion be helpful in seeing that a patient is turned at frequent intervals. The most meticulous attention must be devoted to the airway, and the use of oxygen is often indicated in the postoperative period. Tracheotomy may be necessary, perhaps because of the profound depression of the patient's reflex functions, though sometimes it would seem because of an abnormal stimulation of bronchial secretion. Careful attention to electrolyte and fluid balance, the use of gastric feedings, detailed attention to bladder and bowel evacuation and judicious use of antibiotics, all contribute to the eventual favorable outcome.

It may be well to comment on increased intracranial pressure, which has been traditionally considered as deleterious in itself. That this is not necessarily so was suggested by Browder and Meyers (1) and the evidence against the deduc-

tion has been corroborated by Evans and associates (2). It now seems safe to conclude that methods devised for the reduction of intracranial pressure have no special therapeutic significance other than that they may reduce for the surgeon some of the technical aspects of his problem, and allow for effective exploration and less destructive handling of tissue than is the case in the face of sharply increased pressure. It is common teaching that space-consuming lesions, such as clots, are associated with signs of increased intracranial pressure, and so long as such signs are lacking the problem may not be urgent. Both of these assumptions are invalid and must not be relied upon.

DIRECT BRAIN INJURY

The second general category with which we propose to deal is that of direct brain injury, in contrast to the indirect alterations which result from the presence of compressing clots.

Here perhaps it would be well to discuss the mechanisms associated with loss of consciousness. The recent work of French and Magoun (3), and of other investigators, suggests that the areas of the brain responsible for the maintenance of a state of awareness are the reticular systems of the brain stem. When the activity of these cells is depressed, for any one of a variety of reasons, awareness is dulled and unconsciousness may develop. Various normal and abnormal mechanisms may be responsible for the disruption of the activity of these cells. Thus, it seems likely that the sudden inpouring of afferent impulses, such as may occur in association with fracture of the femur, may temporarily disrupt consciousness. The knockout blow of the boxer may temporarily suspend the activity of these centers and if the blow be of sufficiently severe nature, there may occur varying degrees of actual disruption of these centers. Likewise, clinical evidence suggests that compression of the brain stem may cause depression of consciousness and, if maintained long enough, may produce circulatory changes leading to irreversible damage (4). Finally, to emphasize the importance of this general concept, there may be cited the recent work of French *et al.* (5) on the neural basis of anesthesia.

With these preliminary remarks, one may point out that cerebral concussion—which we define as the temporary loss of consciousness associated with head injury and which we postulate as unaccompanied by demonstrable organic change—is in all likelihood the result of temporary disruption of the normal activity of the centers of consciousness, due to the transmission of force to the cells. Hence, whether the cause of the concussion be acceleration, as when the head is struck by an oncoming force, or whether it be deceleration, as when the freely moving head is abruptly retarded, the effect on the nerve cells in the reticular formation is presumably the same. These are the two common causes of loss of consciousness in patients. From the practical point of view they are not of clinical importance, because no actual structural damage has occurred to the brain; the patient soon recovers consciousness and is again quite himself.

Of greater practical importance are the structural changes which may develop after trauma. Should these be contusions, they may, if they lie in silent areas

of the brain, give no evidence of their presence. On the other hand, should they occur in the sensorimotor cortex, there may be paresis and sensory disturbances in the opposite side of the body subserved by that portion of the cortex; or should, for example, the contusion lie in the visual areas of the occipital lobe, there may be visual field disturbances, the permanence of which will depend on the severity of the injury. It seems likely that many of the cases of profound and prolonged unconsciousness are the direct result of contusions of the reticular systems previously referred to as responsible for the maintenance of consciousness. By the same token, lacerations of greater or lesser extent may produce similar dysfunction, depending upon their location. Occasionally, severe contusions or lacerations may give rise to the development of intracerebral hematoma formation. When such lesions develop they may be hard to differentiate from epidural and subdural hematomas but, like the meningeal clots, they also require evacuation.

From the practical point of view in dealing with acute head injuries, the lesion of the brain itself which it is important to recognize is that of intracerebral hemorrhage, since this may be subject to surgical evacuation.

It must be clearly recognized that the present state of knowledge concerning the other forms of brain injury proper is such that specific therapeutic measures are not adequately defined. Since the problem at hand is the preservation of the life of damaged nerve cells and the restoration of as many of these cells as possible to normal function, one must be concerned about providing the optimum environment for these cells. It is exactly herein that older individuals display their lesser resiliency to injury. Aging nerve cells are seemingly less resilient than their younger fellows. Aging vascular trees are less well able to absorb trauma and to adjust to new physiologic demands. Hence, the physician who treats an older individual following a head injury must first satisfy himself that there is no lesion amenable to surgical therapy or, if there is, that the patient is placed in the hands of a competent surgeon. His second responsibility is to restore the patient to as normal a general overall physiologic state as is within his power. This means that he must establish and maintain an adequate airway, that he must treat shock if it be present, and that he must provide supplementary oxygen when indicated. Furthermore, he must attend to the fluid and electrolyte demands of the injured body. The comatose patient must be turned at frequent intervals, his chest carefully watched and urinary and gastrointestinal tract activity carefully observed. If the physician meets with these basic demands of the patient, he is fulfilling his responsibility for the care of that individual.

It is to be hoped that research currently being carried on in many centers will yield results that may help to restore the efficiency of those nerve cells which have not, at the time of the initial insult, suffered irreversible damage. This is a field of investigation that promises rich rewards in the field of geriatrics.

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TUMORS OF THE OCULAR STRUCTURES IN THE ADULT

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Comparatively few individuals pass through the adult stage of life without having experienced some anxiety at times with reference to aberrant growths in and about the eyes. Fortunately, most of the tumors in this region are treated successfully. Occasionally, an ocular neoplasm is resistant to all forms of treatment and causes the death of the patient.

One of the most difficult problems which confronts the medical practitioner or eye surgeon is to determine whether or not a small growth on the eyelid, on the eyeball or within the globe, is cancerous. The diagnosis should not be made on the basis of appearance alone, because some of the most harmless looking masses will present malignant changes when examined with the microscope. Therefore, every available clinical and laboratory procedure should be used to prove the nature of any unusual lesion in or about the eyes. Such diagnostic tests should be performed before any treatment is undertaken or prescribed.

Neither the ophthalmologist, who is somewhat familiar with "new-growths" of the eyes, nor the practitioner, who may be less experienced, should be tempted to use the cautery or chemicals before a pathologic examination is made. It is possible that a benign looking mass will contain malignant cells, and that these will respond to radiation therapy. On the other hand, irradiation with radium or x-rays is extremely dangerous when used about the eyes. These agents may convert a benign lesion into a potentially malignant one, and may induce irreversible changes in the crystalline lens, leading to cataract formation and blindness.

An example of injudicious use of x-ray therapy is seen frequently in the treatment of blepharitis, a chronic redness and irritation of the eyelids. The formation of epithelioma or skin cancer often follows radiation therapy and it is not unusual for extensive plastic operations to become necessary after such treatment. Complications of this type may not occur until several years have elapsed and the patient has difficulty remembering the details of early treatment. The common inclination of some dermatologists, ophthalmologists and practitioners has been to prescribe x-ray treatment, without first performing a biopsy, and without regard for long-term results. If radiation treatment is considered necessary, the eye should be protected by a lead shield or other device, in order to prevent inflammation of the cornea and uvea or the eventual development of cataract. Radiation is a valuable accessory treatment, with proper precautions, but should be used only after all other methods have failed. Our knowledge of the various rays is increasing, due to the development of atomic energy but the future results rest with time alone and cannot be hurried.

Received for publication April 13, 1953.

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FIG. 1. Multiple papillomas of the upper eyelid; no recurrence after excision and desiccation.

FIG. 2. Mixed-cell (basal and squamous cell) carcinoma, as a result of prolonged radiation treatment for blepharitis and chalazia. Radical removal of eyelid and plastic reconstruction necessary for cure.

TUMORS OF THE EYELIDS

Examples are shown in Figures 1, 2 and 3.

Chalazia

The most common benign tumor involving the eyelids is the chalazion, or chronic inflammatory cyst, of one or more of the Meibomian glands. In the early

stages, the inflammation is acute and it is difficult to differentiate it from the common stye. As the condition subsides, the single duct of the gland becomes occluded and a cyst is formed. The usual treatment is incision and curettage from the underside of the eyelids, or removal of the diseased gland by dissection from the outside. In some instances, the swelling recurs and it is necessary to reoperate after the acute stage has subsided. If the chalazion fails to respond to excision or dissection, the surgeon should be on his guard for possible malignancy. Obviously, a biopsy should be made and sections studied with the microscope to rule out the possibility of cancer. Few ophthalmologists have finished their careers without being deceived on several occasions by benign-appearing chalazia which proved to be malignant upon biopsy. The common types of malignant tumors affecting the Meibomian glands are the epidermoid, basal and glandular types of cancerous growths. Needless to say, radical excision is

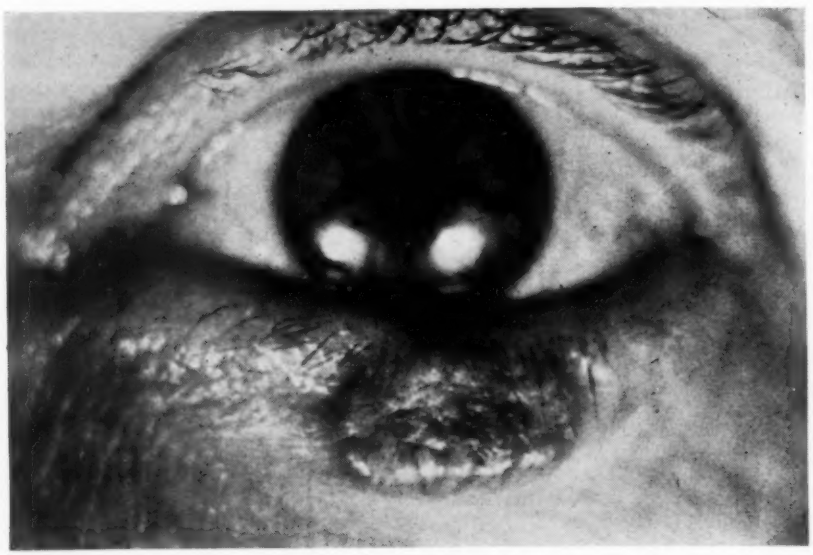

FIG. 3. Basal-cell carcinoma of the lower eyelid.

required, carried out by an ophthalmic surgeon with considerable experience in plastic surgery of the eyelids.

Xanthelasmas

Benign tumors which may arouse considerable anxiety on the part of the patient, are the flattened, slightly elevated, yellowish patches, called xanthelasmas. They usually appear at the inner corners of the eye on the upper and lower eyelids. These tumors occur most often in women and may be considered as a kind of lipoid degeneration of the subcutaneous tissues. The best treatment is "clean" excision, with reapposition of the skin margins by fine interrupted sutures. Sometimes the discoloration caused by the tumor is rather extensive and it may be necessary to restore the skin defect by plastic procedures. Xanthelasmas are usually removed for cosmetic reasons only, as they rarely become malignant.

Birthmarks

Angiomas or blood vessel tumors of the eyelids are recognized as birthmarks and are considered benign, but they have a tendency to grow and invade deeper structures, including bone. There are two distinct types: 1) the familiar port-wine stain or birthmark, which is a dilation of the capillaries of the skin, and 2) the larger worm-like mass coming from the deeper vessels and seen as a bluish area beneath the skin. The latter is often seen in children and is best treated with radiation therapy if it is not amenable to surgery.

Verrucas or warts

Verruca-like growths, or warts and papillomas of the eyelids should be removed and sectioned for microscopic study. Their bases may be treated with the electric cautery and the edges of the wound approximated with fine sutures. These tumors are not particularly harmful unless the lid margin is involved. When this occurs, the eyeball becomes inflamed and sometimes ulcerated. Removal is necessary under these circumstances but considerable care has to be taken to prevent deformity of the lash margin.

Miscellaneous—benign

Other benign tumors affecting the eyelids and causing little trouble other than cosmetic discomfort are milia or small retention cysts of sebaceous glands. These are treated by incision and expression. The molluscum contagiosum, a white discrete umbilicated tumor of viral origin, may be excised and cauterized mildly. Cutaneous horns are hardened outgrowths of the skin and usually respond to simple excision.

Malignant tumors

The common malignant tumors involving the eyelids are the squamous-cell and basal-cell epitheliomas. The squamous and mixed types do not respond readily to radiation and are best treated by early excision. They tend to recur and may spread to other areas and metastasize to other parts of the body. The pure basal-cell type may be cured entirely by excision and is definitely retarded by irradiation with x-rays, and radium. Both of these forms of skin cancer may appear benign but only a biopsy will give the correct answer and indicate the proper type of treatment.

Treatment

A thorough understanding of the anatomic relationship of the various structures making up the eyelids is of great importance. The blood supply, lymph drainage and innervation of the area must be understood before good cosmetic and functional results can be attained.

The skin of the eyelids is thin, flexible, and lends itself to easy manipulation and rearrangement. This makes it possible to prepare flaps from adjacent skin to fill in areas made bare by excision of the tumor. In many instances it is only necessary to make an elliptical incision with moderate undermining of the normal

skin. After the tumor is removed the edges of the skin are united by fine interrupted sutures. It is well to remember that the incisions should be in the general direction of normal skin folds or wrinkles and that, generally speaking, most incisions on the outer surface of the lid should be parallel to the palpebral margins. Incisions on the inner side of the lid are more satisfactory if they are made vertically to the lid margin. Scar formation from a vertical incision is less irritating to the globe on its upward and downward movement.

Tumors involving the full thickness of the lid or the tarsus require more extensive treatment. The "halving" procedure, in which the skin is united to one side of the tarsal union, prevents notching and disfigurement of the lid margins. In some instances involving more extensive reconstructions, it is necessary to transplant a part of the tarsus from the opposite lid.

The selection of an anesthetic is important. Local anesthesia should not be used if the growth is extensive and requires considerable repair. If infiltration anesthesia is used, it should be injected at a safe distance from the involved area, in order to prevent extension.

A proper dressing with sufficient pressure, left in place for at least five days, depending on the extent of the procedure, is almost as important as the operation itself. The sutures, which are usually fine silk, often separate themselves at the time of the first dressing and should be removed by the seventh day.

The results of most plastic procedures about the eyelids are good. The function of the lids is maintained and the cosmetic appearance is little changed. The tumor can be examined microscopically and if other treatment is indicated it can be prescribed with intelligence.

TUMORS OF THE EYEBALL

Examples are shown in Figures 4, 5, 6, 7 and 8.

Corneal and conjunctival growths

Almost all adults have slightly elevated, yellowish patches or pinguecula on the eyeball on the nasal side of the cornea in the horizontal axis. These areas are not especially vascularized, are painless and resemble chicken fat beneath the conjunctival covering. No treatment is needed except for cosmetic reasons or unexpected growth.

The pterygium is an irritative extension of the conjunctiva over the edge of the cornea, which is due to exposure of the eye to external irritants such as dust, gases and foreign bodies. The growth appears on the nasal side of the cornea and is characterized by infiltration and mild ulceration as it advances over the corneal margin. Considerable congestion is present over the area, which lies in the horizontal, exposed part of the eye. It is possible for a pterygium to develop on the temporal side of the globe and sometimes pinguecula are involved in the process. These growths seldom become malignant, but unless they are removed they may cause loss of vision from scar formation.

Although the growths just described seldom show malignant change, epitheliomas do occur in this exposed locality and any suspicious alteration demands immediate excision and microscopic examination.

Occlusion of the lymphatics of the conjunctiva often produces small beady, translucent bodies within the conjunctival membrane covering the globe. These small bodies are about the size of ordinary polished rice grains and are some-

FIG. 4. Benign dermoid cyst of the corneo-scleral junction, later removed by dissection and plastic repair.

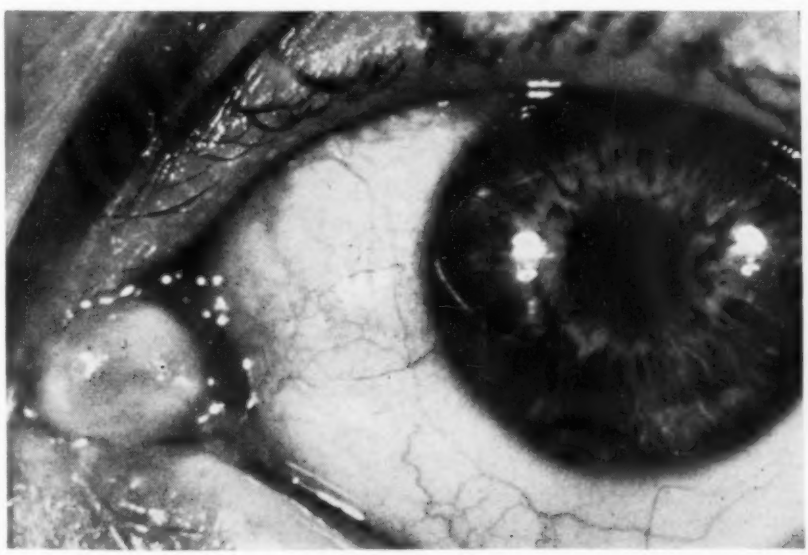

FIG. 5. Sebaceous cyst of the caruncle, later successfully excised.

times about as hard. They irritate the eye like other foreign bodies and should be removed by an eye surgeon.

The dermoid growth of the conjunctiva is a smooth white elevated mass, usually extending over the margin of the lower outer portion of the cornea, with one or more hairs projecting from its apex. The tumor is considered benign but

if permitted to remain will often grow over the surface of the cornea causing loss of sight. It consists of aberrant skin, containing hairs, oil, and sweat glands. Other malformations are usually present. The removal of this tumor requires

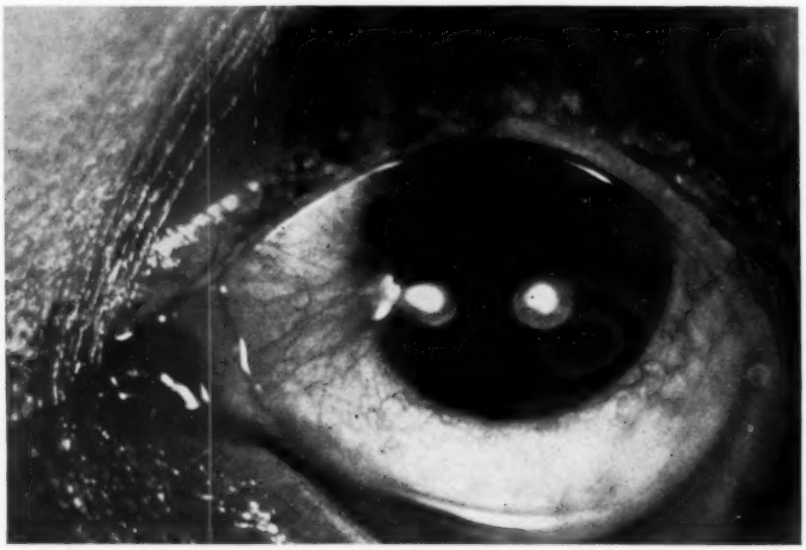

FIG. 6. Malignant melanoma of the caruncle with an unrelated pterygium. Operation deferred for fear of immediate metastasis.

FIG. 7. Epithelioma of limbus, later treated successfully by excision and plastic repair.

considerable skill because of its retractability and lack of distinction from other structures at the time of operation.

The malignant tumors of the conjunctiva are the various types of cancers such as carcinomas and malignant melanomas. Radical treatment is required for each of these, following proper classification after biopsy.

Intraocular neoplasms

Neoplasms within the globe are very rare but extremely important because the most deadly of all tumors, the malignant melanoma, arises most frequently in the vascular coat of the eye or the uvea.

The benign tumors most commonly encountered on external examination are usually nevi of the iris. Sometimes cysts of the iris are recognized on gross examination but it is difficult to differentiate them from malignant growths. It is not considered good practice to obtain specimens for microscopic study from within the globe, because of the danger of immediate metastasis.

A nevus of the iris gives the gross appearance of a heavily pigmented freckle. Its progress may be recorded by photographic records. If it tends to grow, it may be excised with a generous iridectomy and studied in the laboratory. If it

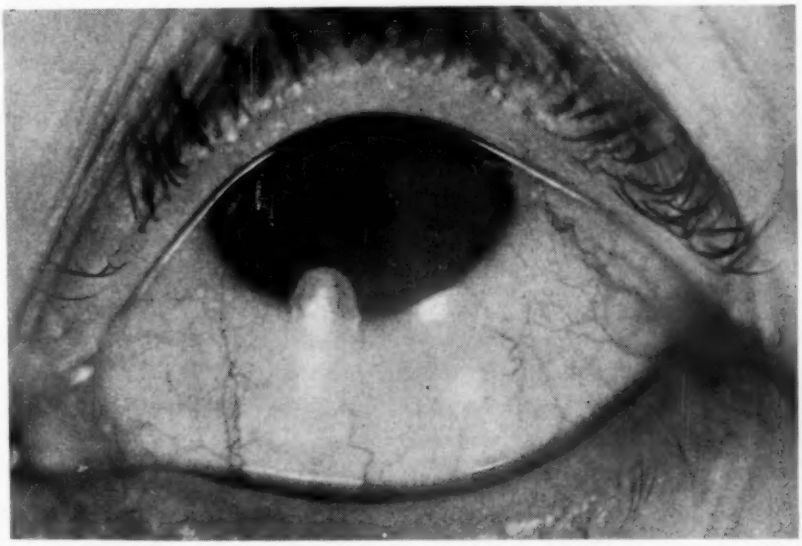

FIG. 8. Nevus of the iris—the dark triangular area at "8 o'clock," pointing to the pupil

proves to be malignant melanoma, the eye has to be sacrificed. This type of intraocular biopsy is acceptable. If a tumor of the choroid is recognized, however, the eye is enucleated first and studied later in the laboratory.

Malignant melanoma. The diagnosis of malignant melanoma of the choroid is made on the appearance of the tumor when examined with the ophthalmoscope, the failure to transilluminate, the increased intraocular tension, and the presence of iridocyclitis from toxins. It should be differentiated from simple detachment of the retina by the wavy appearance, lack of pigment, presence of tears, and clear transillumination of the latter. Aspiration (a dangerous procedure) may be resorted to, if carried out with sufficient care, but frequently severe hemorrhage occurs and the growth spreads immediately. Transillumination does not help when the tumor is situated far posteriorly in the globe.

The treatment of melanoma or any malignant tumor in the globe is immediate enucleation. This should be performed as soon as the condition is recognized but even then, extension and metastases may have already occurred. The

socket may be treated by radiation. Exenteration may be indicated if any of of the growth is found to have penetrated the globe.

Carcinoma. Primary carcinomas of the uveal tract are exceedingly rare; however, cases have been reported as having arisen from the pigmented epithelium. These tumors are derived from the neural epiblast, are highly pigmented and apparently more malignant than sarcomas. It is thought by some that they arise from innocent-appearing nevi. It is further argued that nevi within the globe are epithelial in origin.

In the eye, metastatic carcinomas are more frequently found than primary carcinomas. There seems to be a slight predominance in females and the metastatic forms are generally secondary to foci in the breast, thyroid, stomach or genitalia. Carcinomas occur in the later years of life, and patients seldom live over a year after involvement of the eye, generally succumbing within a few months.

SUMMARY

The nature and treatment of both benign and malignant tumors of the eyelids and eyeball have been discussed.

FEAR IN ELDERLY PEOPLE

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Fear is a very real disease in our aging population. It is a common source of visits to the physician's office and is a major deterrent to achieving a comfortable and quiet old age. We cannot say that the emotion is entirely pathologic at this stage of life, for who can predict what may lie ahead for the elderly? Be that as it may, trial by fear is a supreme emotional chaos through which many splendid older people go. Our purpose in this brief article is to consider in simple language the fears of the aged and what the family physician may do to treat them.

To begin with, we must consider the emotion itself. Fear is certainly one of the strongest and one of the most disquieting of all the emotions. *It is a component of all emotional disease.* One is tempted to say it is a component of all mental processes, though it is doubtful that this could be proved.

Many good old people suffering from acute anxiety are labeled "crocks" and sent on their way with the assertion that "nothing can be done for you." There is no justification for not attempting to treat these people.

We should begin by admitting that most elderly people are not amenable to the more subtle techniques of psychotherapy. From the practical standpoint, reassurance and minor explanations given with large doses of human understanding are the best attack on the problem. Patterns of thought in the elderly are well organized and scarcely susceptible to change within the realm of practical therapy. Most old people need reassurance, encouragement, and understanding as much or more than they need medical treatment.

The principal sources of fear are well known. We shall list four of the most common and discuss each briefly, with recommendations as to the part the family physician can play in helping such patients.

1. *Fear of disease and disability.* Many old people are almost morbidly concerned with the various biologic processes of the body. They have been told since they were young of all the terrible trials that are a part of living in an aging body. Frequently, they are led to anticipate the future with horror.

Most of these fears are totally unfounded. It is quite true that the aging body will not function as it did in former years, but it is not true that pain and disability are a normal and natural part of old age. That statement will sound childishly simple to the average physician, but you would be surprised at the number of your patients who think that such afflictions are inevitable. Take time to reassure them.

The elderly patient is sometimes led to believe that each of the functions of his body will diminish to the point where it is difficult to carry on even the basic processes necessary to life. Some people look upon approaching death as a

Received for publication April 1, 1953.

gradual disintegration which must, of necessity, be painful. Although no one should attempt to say for certain, I have a definite impression that death, in most instances, is more painful to the watcher than to the participant. This again is a simple fact, but one which is not known to many patients.

The point should be made in discussing such a problem with old people that dissolution can be a pleasant decline into the nothingness of complete rest. There are certain rules of the game which must be followed, but they are not at all difficult. The patient must not attempt to exceed the physical competence of his own body. He must not attempt to behave, think, or act with the same facility of expression that he did fifty years previously. Perhaps, most important, he must learn that there are joys in the observation of people and pleasures in progeny that he had scarce estimated before.

He must realize that old joints, like old hinges, wear out and cannot be used as new ones. He must realize that the muscles of an old heart do not have the reserve of power that the muscles of a young heart do. He must understand that acuteness of vision may diminish but that acuteness of thought rarely does, from his standpoint. Those of us in the medical profession know full well that cerebration does lessen in efficiency but there is a blissful unawareness of this in the average elderly patient. The old patient must realize that the winters are going to get colder and people won't talk as loudly as they did in his youth. Old age may show lack of acuity of thought but it brings the wisdom of silence and observation. The petty, nasty, childish oldster is the exception rather than the rule.

The family physician should tell his patient that there is a difference between disease and wearing out. He should tell his patient that there is little more need to fear disease, as such, at the age of 70 than at the age of 50. The patient should be reassured that pain is not a normal part of growing old and that it is not a normal happening, except in those who attempt to exceed physical limitations.

Disability is a part of being ancient but the word has a different meaning than it has in younger people. Many disabilities of the aged are simply evidences of wear and tear, whereas disabilities in the young are usually traumatic in origin. If the patient speaks or thinks of traumatic disability, he should be informed that he actually has less probability of such occurring in his old age than in his active working years. If he speaks of the disability of wear and tear, he is perhaps confusing *disability* with *inability* to do the things he once did.

A very frank discussion of these fears of disease and disability may serve to help the elderly patient in many instances. The physician should not minimize the fact that difficulties occur, but should call attention to the different connotations of the words involved and to the fact that there is little pain, except in rare instances.

2. *Fear of uselessness.* Most people respond with horror to the thought that they may become dependent upon other people for charitable support. A man or woman who has spent an entire lifetime in useful effort and who has "stood on his own feet" throughout life finds childish dependency a hard position to accept. The man who has been busy all his life but suddenly finds there is nothing

left to do can be deeply miserable. Many people look forward to this time of leisure with apprehension.

In actuality, the old person is in no way useless. He or she is simply required to change fields of activity. The old man who has worked all his life and suddenly retires can find much profitable work to do, if he can face transition of interests with equanimity. He can work about the home to make it a more pleasant dwelling. He can become invaluable to the world by instructing his grandchildren and passing along such wisdom as may have been accumulated through the years. On the other hand, he can be an utter nuisance if he spends all his time bemoaning the fact that he no longer engages in productive activity.

We should take time to explain to such people that there is more than one kind of productive activity. Stagnation is the great danger of old age. That fact should be squarely met as a major problem by each person who contemplates retirement. The doctor can do much in such cases by explaining that all that is needed is a redirection of energy and that the greatest possible danger is the danger of doing nothing but waiting to die. Many fretful, short-tempered oldsters exhibit these characteristics simply because they have nothing to do.

Tell your patients that there are few examples of a totally useless person.

3. *Fear of loss of social contact.* Many people, as they grow older, gradually begin to lose contact with people their own age and of their own group. They become less amenable to travel and less anxious to move about enough to see their friends. The inroads of death operate to narrow their acquaintance. It sometimes takes several years for this gradual loss of social contact to be brought home to the aging person. When he gains full realization of the possibility of aloneness, there may be engendered a very real and vicious fear complex. When such is the case, not a few older people go through a stage of acute anxiety.

Such people are frequently seen in the physician's office and are usually obviously tense, nervous, and irritable. Quite frankly it takes a master of the art of medicine to pry out of them the basic cause of their discontent. With patience and with application of understanding the personal physician will usually be able to do so.

There is not a good answer to this complaint of old age. It is seldom realized in its full and terrifying force by the physician or by younger people who have had no opportunity to experience it and no occasion to think about the problem. Nonetheless it is a real problem and a major producer of fear.

This question is seldom handled well between the physician and the patient. It is best to talk with the family of the older person and point out that the necessity for contacts with other people in similar age groups is just as strong in old age as it is in childhood. In most instances arrangements can be made to foster such contact and, when this is done, the fear usually disappears.

The part of the family physician is momentary reassurance of the elderly patient and cooperation with his family to assure that opportunity for contact with other old people is given.

4. *The fear of death.* Most people can die with complacency but few people can bear the thought of approaching dissolution. It is true that the highly in-

tellectual individual may be able to overcome a great portion of these fears and make a relatively placid approach to the termination of his life.

The average individual, however, is haunted by fear of the totally unknown. As a matter of fact, one can use this as a convincing argument for the basic concepts of religion. If man has the knowledge that he is something more than his body, if he knows with some degree of certainty that he will go on after his body has ceased to function, then there is no cause at all for fear of death.

Assuaging this fear of death is often a mutual task of the doctor and the clergyman. It involves the exhibition of both psychology and philosophy and may be best accomplished by such cooperation.

Those of us in the medical profession know that dissolution is not the terrifying procedure that the average person may think. It is almost impossible to convey this knowledge without the added comfort of theological reasoning pointing to the hereafter. No man should be afraid to go to a better place and no man should attempt to practice medicine unless he believes full well in a supreme power and a better place. It is perhaps not out of the bounds of reasoning for the doctor to point out to the patient that death is a transition, not a termination. As such, it may be briefly unpleasant, as many transitions are, but the final result is likely to be good for the good man.

In the last hundred years there has been an interesting change in the philosophy of most people toward death. It is now regarded as an interloper, a horrible eventuality faced by all people. The possibility of its occurrence is borne as a cross upon the minds of most people.

In times past it was regarded as a natural normal way of terminating one's life as a human being. The probable reason for the change is the building up of many cares, anxieties and torments resulting from emphasis on fear of the unknown.

A simple therapeutic measure is to point out to the patient that the hereafter is not unknown. Man has no more definite evidence of anything around and about the universe than he has of the existence of a hereafter. He cannot know its form, its dimensions or its duration. Most important, he cannot refute its inevitability. Such things are not out of line for the physician to say. The older person may be told that it is perfectly normal and natural to fear any transition period, for transition may be difficult. It is, however, distinctly abnormal to recognize more than fear of actual transition.

This has been an effort to simplify and discuss in everyday terms some of the fears common in our aging population. Beyond any doubt it is not complete, nor is it the basis for an adequate program of therapy. Nevertheless, it is important that the physician realize the tremendous power of these fears, and that he take his place in trying to reassure the members of our elderly population who come to him seeking surcease from worry.

AMERICAN GERIATRICS SOCIETY

THE 1954 ANNUAL MEETING

The 11th Annual Meeting of the American Geriatrics Society will be held in San Francisco just preceding the meeting of the American Medical Association. The scientific sessions of the meeting will begin Thursday, June 17 and continue through Saturday, June 19. The name of the hotel will be announced shortly.

Members who wish to present papers at the meeting should send six copies of the title and abstract not to exceed 300 words to the Secretary, Dr. Malford W. Thewlis, 25 Mechanic Street, Wakefield, Rhode Island, **not later than FEBRUARY 1, 1954.**

BOOKS RECEIVED

Films in the Cardiovascular Diseases: Survey, Analysis, and Conclusions. By D. S. Ruhe, A. Nichtenhauser, L. L. Leveridge, H. J. Weintraub and N. M. Luger. A monograph prepared by the staff of the Medical Audio-Visual Institute of the Association of American Medical Colleges and published jointly with the American Heart Association; 128 pages; 1953. American Heart Association, Inc., 44 East 23rd Street, New York, N. Y. Paper, $1.50; cloth $2.00.

Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Blood Vessels. Fifth edition, revised. By H. E. B. Pardee, A. C. DeGraff, C. E. de la Chapelle, C. Eggleston, C. E. Kossmann, E. P. Maynard, Jr., J. B. Schwedel, H. J. Stewart and I. S. Wright, the Criteria Committee of the New York Heart Association, Inc.; 360 pages; 51 figures; 1953. Published by the New York Heart Association and distributed by the American Heart Association, Inc., 44 East 23rd Street, New York, N. Y. Price $4.95.